## A Quick Introduction to Production

his section includes skill standards for the manufacturing concentration of Production. These skill standards were developed by the Manufacturing Skill Standards Council (MSSC), under the auspices of the National Skill Standards Board (NSSB).

For a detailed explanation of each aspect of the standards, see *A Quick Orientation*, one of the guidebooks included with your binder.

### Skill Standards: A Brief Explanation

The MSSC developed skill standards for six concentrations – major areas of frontline manufacturing work covering families of related jobs. The standards in this document cover the Production concentration. The Production concentration is defined as follows:

PRODU	PRODUCTION				
DEFINITION	SAMPLE JOBS COVERED				
Set up, operate, monitor, control, and improve man- ufacturing process- es and schedules to meet customer and business require- ments.	Operator, production associate, assembler, set-up operator, fabricator, systems operator, production lead, and process control operator				

The skill standards are made up of two major components. They are:

**Information** *About the Work.* This component describes what workers need to be able to do on the job to perform competently. It includes:

- Critical Work Functions The major responsibilities of work within a concentration.
- Key Activities The major duties or tasks involved in carrying out a critical work function.
- Performance Indicators Indicators of how to determine when someone is performing each key activity competently.

**Information** *About the Worker*: This aspect of the skill standards describes the knowledge and skills an individual needs to perform the work described by each critical work function, along with its key activities and performance indicators. There are three types of knowledge and skills:

- Academic Knowledge and Skills –
   Academic skills such as mathematics, reading, etc.
- Employability Knowledge and Skills –
  Broadly applicable skills such as working in teams, analyzing and solving problems, etc.
- Occupational and Technical Knowledge and Skills – Occupational and technical skills that tend to be specific to an industry or concentration, such as skill in using inspection tools and equipment, knowledge of manufacturing processes, etc.

For the academic and employability knowledge and skills, the MSSC skill standards provide:

Complexity Ratings: These ratings tells us, for a given critical work function, the level of complexity required in a particular academic or employability knowledge and skill. For example, if writing is required in order to perform a given critical work function, the complexity rating would tell us whether someone needs to write telephone messages versus technical manuals. These ratings were developed using the NSSB Academic and Employability Skill Scales. For more information on the scales and complexity ratings, see *A Quick Orientation* and the *Skill Scales Companion Guide*. There are two types of complexity ratings in the skill standards:

**Overall Complexity Rating**: As the name implies, the overall complexity rating gives us a rough estimate of the overall level of complexity required for a given knowledge and skill. These ratings are provided for frontline workers (represented by the symbol "W") and first-line supervisors (represented by the symbol "S"). The scale is: L = Low; M = Moderate; and H = High

In some cases, the overall complexity rating was **NA** (**Non-Applicable**). This means that this skill was deemed not to be needed to perform this given critical work function, so no complexity rating was assigned.

**Subdimension Complexity Rating**: To give users more detailed information, the

MSSC skill standards also provide an individual rating for each subdimension in the NSSB Academic and Employability Skill Scale (See the *Skill Scales Companion Guide*). These ratings apply to frontline workers only. Ratings have not been developed for first-line supervisors at this time. The scale is: **L** = **Low**; **M** = **Moderate**; **and H** = **High** 

In some cases, the subdimension complexity rating was **NA** (**Non-Applicable**). This means that this *particular dimension* of the skill was deemed not to be needed to perform this given critical work function, so no complexity rating was assigned.

### Occupational and Technical Knowledge and Skills

Occupational and technical knowledge and skills are unique to a given industry sector or concentration. In manufacturing, they include knowledge and skills in areas such as inspection tools and equipment, production tools and equipment, and manufacturing processes.

The MSSC standards describe the occupational and technical knowledge and skills needed to perform each critical work function. The occupational and technical knowledge and skills are grouped into categories, with specific examples under each category. Please note that the MSSC did not develop complexity ratings for the occupational and technical knowledge and skills. This may be a part of future research.

## **Tips for Getting Started**

Here are step-by-step instructions to help you get started:

- 1. Find a critical work function that interests you. Read each of its key activities, along with its associated performance indicators. You will find this information in the "About the Work" section on the left-hand page.
- 2. Open the fold-out pages and examine the "About the Worker" sections that focus on the academic and employability knowledge and skills.
- 3. Start by looking at the first academic knowledge and skill, which is always math, and find out the overall complexity rating

- by looking across the table to the right. To understand what this rating means, see the *Skill Scales Companion Guide*.
- 4. To find out the subdimension ratings for math, look further across the standards, using the *Skill Scales Companion Guide* to understand what each rating means. Repeat process for rest of academic and employability knowledge and skills.
- 5. Now, look at the occupational and technical knowledge and skills needed for this critical work function. These are located on the back page of the two-page fold-out section.

Concentrations

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## Critical Work Function: Produce product to meet customer needs.

#### Critical work functions

describe the major responsibilities involved in carrying out a concentration

### **Key Activities**

#### **Key activities** are the duties and tasks involved in carrying out a critical work function

#### Performance Indicators

**Performance indicators** correlate to the key activities. The performance indicators provide information on how to determine when someone is performing each key activity competently

#### **Identify** customer needs

The different and common needs of internal and external customers are recognized.

Customer contact about product aspects and printed specifications is maintained to ensure understanding of

Customer needs are reviewed on a regular basis.

Customer specifications are up-to-date.

Customer needs are communicated effectively to others including shift-to-shift, co-workers, and managers. Issues preventing customer needs from being met are addressed proactively.

#### Determine that resources such as materials, tools and equipment, are available for the production process

Raw materials are checked against work order.

Tools and equipment are checked against work order.

Inventory discrepancies are communicated to the proper parties.

Necessary resources are at workstation when required.

Workers with appropriate skills are scheduled according to production needs.

#### Set up equipment for the production process

Proper repairs and adjustments are made to production equipment prior to putting into service.

Set-up meets process specifications of internal and external customers.

First piece or production run meets specifications.

Set-up procedures are documented for repeatability.

Set-up meets ergonomic and other relevant health, safety, and environmental standards.

Set-up meets equipment specifications.

#### Perform and monitor the process to make the product

Process control data indicates that the manufacturing process is in compliance with standards.

Manufacturing process cycle time meets customer and business needs.

Operations are performed safely.

Product meets customer specifications.

Product and process documentation is completed, maintained and forwarded to the proper parties. Production operations comply with all health, safety, and environmental policies and procedures.

#### Inspect the product to make sure it meets specifications

The calibration of the testing equipment is verified.

Established sampling plan and inspection policies and procedures are followed.

Product and production processes that do not meet specifications are identified promptly.

Inspection documentation is completed accurately and forwarded to the correct parties.

Appropriate testing and inspection tools and procedures are followed.

Adjustments needed to bring the production process back into specification are identified and communicated. Necessary adjustments are performed in a timely manner.

#### Document product and process compliance with customer requirements

Documentation of compliance is legible.

Documentation of compliance is written in the appropriate format and correctly stored.

Documentation of compliance is forwarded to the proper parties.

Documentation is complete and "sign off" is obtained.

Products are labeled appropriately for compliance or non-compliance.

#### Prepare final product for shipping or distribution

Packaging materials meet packaging and shipping specifications, including proper labeling.

Completed documentation of packaging and customer shipping instructions accompany the product to the next destination.

Product availability is communicated to the proper parties in a timely manner.

The product and all relevant information such as quantity, destination, and packaging instructions, are checked against the work order.

Product is correctly stored or staged for shipping.

All laws and regulations with regard to labeling, packaging, and transport are followed.

Material handling procedures are followed to prevent product damage.

## **About the Work**

Describes what a worker needs to know or be able to do to perform the critical work function

### ACADEMIC AND EMPLOYABILITY SKILLS

Skill	Oversit de ital	ot or conficing	Complexity Dimension	Complexity Subdimension	Condition to
Math	L	L	Complexity of mathematics content	Number sense and computation Geometry, measurement, and spatial sense Complexity of data analysis, statistics, and probability Functions and algebraic thinking Complexity of representation and communication	M L L NA L
			Complexity of problem solving	Mathematical methods Mathematical reasoning Mathematical tools	L L M
Science	NA	L	Complexity of scientific inquiry	Design Use of evidence	NA NA
			Complexity of understanding the nature of science	Unifying concepts and processes	NA
			Complexity of core scientific content	Physical science Life science Earth and space science	NA NA NA
			Complexity of applied science	Science and technology Science in personal and social perspective	NA NA
Reading	М	М	Complexity of text Complexity of reading skills Complexity of reading purpose		M M L
Vriting	L	М	Complexity of text	Complexity of text	L
			Complexity of writing product	Type of product Organization Elaboration	L L L
			Complexity of writing process	Writing development To inform To persuade	L L L
istening	М	М	Complexity of communication	Content complexity Demands on attention Communication indirectness	M M L
			Barriers to communication	Limitations on interaction Distractions	М
Speaking	М	М	Complexity of communication	Content complexity Tact and sensitivity required Communication indirectness	M L L
			Context demands	Diversity of audience Constraints on preparation Distractions Listener resistance	M M M
Using Information and Com-	М	М	Complexity of technology application	Complexity of equipment or technology Complexity of applications Training time constraints	M M M
munications Technology			Frequency of technology change	New learning required	L L NA L L NA
Gathering and Analyzing	М	М	Difficulty of information gathering	Amount of information Number and variety of sources Resourcefulness needed	М
Information			Complexity of analysis	Complexity of information and analysis Need to evaluate source information Lack of analysis guidelines	L

#### ACADEMIC AND EMPLOYABILITY SKILLS

Skill	Overall period	ot overoll leith	conplexity Dimension	Complexity Subdimension	Carrier de la companya de la company
Analyzing and Solving Problems	М	М	Problem complexity	Problem uniqueness or difficulty Number and range of problems	M M
rrobteilis			Solution complexity	Number and complexity of possible solutions	М
Making	М	М	Degree of judgment or inference required	Lack of guidance or precedents	L
Decisions and				Integration difficulty  Quantity or ambiguity of risks and consequences	M M
Judgments				Qualitity of ambiguity of risks and consequences	
			Individual decision-making responsibility	Accountability and autonomy Absence or ambiguity of rules or policy constraints	M L
				policy constraints	<u> </u>
Organizing	М	М	Complexity of plans	Goal complexity or ambiguity	L
and Planning				Flexibility required	M
				Resource coordination required	M
				Scope and effects of planning	М
			Constraints on planning	Lack of guidelines	L
			, ,	Lack of feedback	L
				Constraints on resource availability	М
Using Social	М	м	Complexity of social interactions	Diversity	М
Skills	***		complexity of social interactions	Structure or protocol required	<u> </u>
				Tact and sensitivity required	М
Adaptability	М	М	Degree of adaptability required	Frequency of change	М
			Difficulty of adapting	Unpredictability of change	М
			, 1 0	Lack of support for change	М
Working in Teams	М	М	Degree of collaboration required	Task interdependence	М
			Team member heterogeneity	Team diversity	M
			Goal or role ambiguity	Lack of clarity or support for team goals	L
			Godi of Tote unbigatey	Lack of clarity or stability of responsibilities	M
Leading	М	М	Work challenges	Challenges to goal attainment	М
Others	IAI	IVI	work chanenges	Work structuring requirements	M
o tiners				Scope and complexity of leadership responsibility	NA NA
			B	6 1: " 1	
			People challenges	Coaching or monitoring needs Conflict management needs	NA M
D 111:			Communication in the		A.*
Building Consensus	L	M	Consensus process inhibitors	Number and diversity of stakeholders Ambiguity of goals	M
Consensus				Lack of organizational support, incentives, or	<u> </u>
				consensus leadership	L
				High consensus standard	M
			Difficulty of issues requiring consensus	Complexity of issues	L
			Difficulty of issues requiring consensus	Complexity of issues Contentiousness of issues	M
				Lack of opportunities for agreement	M
Self and Career	М	L	Need for learning and development	Self and career development requirements	М
Develop-			Limitations on learning and development	Time, resource, or support constraints	М
			opportunities	Application constraints	М

Overall complexity ratings: The overall level of complexity required in a skill in order to perform the critical work function. Scale: H=high complexity; M=moderate complexity; and L=low complexity. Two separate ratings are provided: one for workers (entry-level up to first-line supervisors) and the other for supervisors (first-line supervisors). n some cases, the overall complexity rating was NA (Non-Applicable). This means that this skill was deemed not to be needed to perform this given critical work function, so no complexity rating was assigned.

Complexity Subdimension ratings: These are complexity level ratings for individual aspects of the particular skill. Scale: H=high complexity; M=moderate complexity; and L=low complexity. At this time, these ratings are provided for workers only. In some cases, the subdimension complexity rating was NA (Non-Applicable). This means that this particular dimension of the skill was deemed not to be needed to perform this given critical work function, so no complexity rating was assigned.

Describes what a worker needs to know or be able to do to perform the critical work function

#### OCCUPATIONAL AND TECHNICAL KNOWLEDGE AND SKILLS

These are the technical knowledge and skills needed to perform the critical work function.

Skill Category	Specific Knowledge and Skills	Specific Knowledge and Skills
Inspection Tools and Equipment	A. Skill in using inspection equipment, including how to calibrate, what type of equipment to use, and what frequency to use.	B. Skill in using multi-gauging to inspect, verify, and document whether product dimensions meet customer requirements.
Production Tools and Equipment	A. Skill in reading and interpreting gauges (i.e., analog, digital and vernier).     B. Knowledge of how to determine whether additional tools need to be purchased.     C. Knowledge of lubricants and coolants to make the proper selection.	D. Skill in setting up, programming, and operating the computerized control process.     E. Skill in operating production equipment.     F. Knowledge of equipment capabilities to maximize productivity.
Reading and Inter- preting Drawings	A. Skill in interpreting technical drawings so that customer needs are met.	
Manufac- turing Process	A. Skill in communicating work orders and customer needs to production crew to minimize errors and maximize understanding.     B. Knowledge of manufacturing process to be used.     C. Knowledge of the materials to be used.     D. Knowledge of how to order materials and tools.     E. Knowledge of how to use and interpret measurement devices.     F. Knowledge of procedures used to perform a self-inspection.     G. Knowledge of packing and shipping processes to prepare product for shipment.     H. Knowledge of available processes to determine if job can be done.	I. Knowledge of machinery operation, set up and testing.     J. Skill in setting up and testing machines.     K. Knowledge of how to carry out non-compliance procedures.     L. Knowledge of statistical methods to determine when process is out of control.      M.Skill in troubleshooting process to isolate the cause of problem.     N. Knowledge of how to estimate time to determine delivery schedules and cost.      O. Knowledge of how to implement quality assurance principles and method such as ISO 9000.
Customer Awareness	A. Knowledge of how customers will use a product to confirm the product as built will meet customer needs.	
Work Orders and Documen- tation	A. Skill in interpreting work orders to meet customer need.     B. Skill in making machine adjustments.     C. Skill in reviewing order sheets to determine if on-site adjustments are needed.     D. Knowledge of how to use diagrams and technical drawings.     E. Skill in interpreting route sheets and operation sheets to set-up and operate machine.	F. Skill in completing a compliance tag to indicate that the sub-assembly meets the customer requirements.  G. Knowledge of customer shipping instructions to determine packing requirements.  H. Knowledge of available packing materials to determine the safest method of shipping the product.
Health and Safety Policies	A. Knowledge of sanitation procedures.     B. Knowledge of state and federal regulatory requirements (e.g., Occupational Safety and Health Administration (OSHA).     C. Knowledge of safety procedures for chemical spills.     D. Knowledge of how to safely move materials.	E. Knowledge of proper use of shipping safety equipment.     F. Knowledge of emergency or evacuation procedures.     G. Knowledge of Personal Protective Equipment (PPE) requirements, includin safety shoes, goggles and helmets.

	Critical Work Function	on: Produce product to meet customer needs
Knowledge/skill	Mean Importance	Examples
		Use computerized manufacturing system for Bill of Materials specifications and general assembly
Using Information and Communication	4.19	9 procedures
Technology		Use computer to input quality data collected
		Obtain customer requirements from ordering tracking system
		Use a material management system in order to ensure all parts and machine capacity is available to all production
		Use PC to document initial set up of production run
		Gather information on operations and testing of product in order to evaluate conformance to
Gathering and Analyzing Information	4.19	9 specifications
		Obtain information related to customer needs from email to use as a basis for production and scheduling
		Use quality circles to discuss day-to-day production issues and solutions
		Use inspection equipment to locate quality problems and refine the manufacturing process
		Collect data on parts delivery schedule to ensure parts are there when they are needed
Analyzing and Solving Problems	3.94	4 Identify and solve potential problems before final production to ensure customer needs are met
	<u> </u>	Monitor quality of batch to make sure product meets specs
		Identify possible road blocks in order to reduce or remove blockage to meet customer requirements.
		Anticipate production quantities to prepare for shipping and distribution
		Review production schedule and calculate staffing requirements
Making Decisions and Judgments	4.25	5 Determine if product meets specifications before releasing to plant operations
		Determine if initial piece meets required specs so that production may be started
		Determine availability of resources
		Decide if vendor materials are of adequate quality to meet expectations
		Determine proper packaging for product to limit product damage during shipment
Organizing and Planning	3.83	3 Plan production schedule in order to meet customer demand
organizing and rianning		Organize shipping schedules to assure product arrives at next destination on time
		Organize paperwork so that production flows smoothly for operators
		Organize the equipment to create a flow line for the product through a complete stage of production
Hainer Casial Chilla	0.0	4. Most with systems are in a prefereignal way to identify a set are a silic requirement.
Using Social Skills	3.84	4 Meet with customers in a professional way to identify customer specific requirements
		Communicate with vendors who supply materials about requirements with regard to delivery times and product specifications
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	Give positive feedback to internal customers
	Value everyone's input into a team process
	value everyone e input inte a team process
Adaptability	3.94 Change material or part to comply with new customer requirements
	Be receptive to changes of schedules and priorities to meet needs of the customer
	Aid in process or equipment changes to help keep product moving
	Be willing to operate other machines to reduce work load shortages and overloads
Working in Teams	4.13 Coordinate inter-department requirements to ensure final product meets specs
	Work with all team members to coordinate material flow across multiple processes or workstations to
	assure on time delivery
	Work collaboratively with other operators in order to complete all steps of production process
	Engage in cross-functional teams to establish schedule attainment and set goals for daily production
Leading Others	3.68 Help co-workers understand job requirements
	Lead team meetings to determine customer needs, set up priorities and available resources
	Influence other workers to accomplish production and quality goals
	Influence others to work safely even in the face of hurried production
	Coach and train a new employee
Building Consensus	3.13 Be able to explain to the work team why a customer needs a modification
	Encourage co-workers to share a common goalcustomer satisfaction
	Communicate with different levels of management that a process needs to be changed and why
	Resolve issues regarding production and process before implementation
	Resolve conflicts between two team members working together on a line
Self and Career Development	2.97 Acquire new skills and continue education to improve meeting customer needs
	Request training in weak areas to support growth and improve work
	Acquire training on ISO 9000
	Promote and support on-site learning opportunities
Speaking	3.38 Verbally clarify customer needs to co-workers
	Present concerns to supervisor about production schedules and personnel needed to meet that
	schedule
	Provide feedback on process for quality improvement
	Discuss schedules and establish timelines with customers
	Discuss needed changes in materials with customers
Listening	4.07 Listen to and understand work instructions

	Listen to customer requirements, complaints and praise and forward the information to appropriate
	people
	Receive feedback from supervisors
	Listen objectively to the customer's requirements, even though they may exceed existing specs
	Listen to the needs of co-workers regarding production
Writing	3.79 Write memos to communicate problems and changes to fellow team members
	Document inspection results
	Fill out order forms
	Complete SPC chart
	Create written instructions for set-up of production equipment
	Develop written instructions for special material handling
Reading	4.54 Read work instructions and control documents
	Read blueprints to meet customer needs
	Read and understand quality documentation and production spec sheets
	Read instructions required to set up equipment and document process
	Read customer orders
Math	4.34 Add, subtract and divide numbers to adjust inventory report
	Calculate percentages in order to make machine adjustments
	Measure product against specifications for quality assurance (fractions and decimals)
	Understand geometry in order to interpret blueprints
	Calculate the correct amount of products shipped
Science	2.93 Adjust chemical usage and effect on process
	Knowledge of metallurgy in order to ensure that corrosive metals are not combined
	Understand the soldering process and how it works
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#### **P2**

## Critical Work Function: Maintain equipment, tools, and workstations.

#### **Critical work functions**

describe the major responsibilities involved in carrying out a concentration

#### **Key Activities**

#### **Key activities** are the duties and tasks involved in carrying out a critical work function

#### Performance Indicators

Performance indicators correlate to the key activities. The performance indicators provide information on how to determine when someone is performing each key activity competently

#### Perform preventive maintenance and routine repair

Preventive maintenance schedule is prepared and checked as appropriate.

Preventive maintenance is performed to schedule.

Preventive maintenance is documented completely and in a timely manner.

Repair needs are communicated to the correct parties using the right procedures and forms.

Any necessary repair work is checked through follow-up.

Necessary supplies are available to do the preventive maintenance.

Preventive maintenance schedule, documentation, equipment needs and outstanding repairs are communicated effectively from shift-to-shift, to team members, to managers and to others as required.

All safety procedures are followed when doing repairs.

#### **Concentrations**

are the major areas of frontline work covering families of related jobs. Separate standards were identified for each concentration.

#### Monitor equipment indicators to ensure it is operating correctly

Current equipment performance is regularly compared to optimal equipment operations.

Abnormal equipment conditions are investigated.

Abnormal equipment conditions are corrected in a timely manner.

Equipment is monitored to ensure that the corrective action solved the problem.

Documentation of equipment repair history is complete, up-to-date and accurate.

#### Provide training to maintain equipment

Training was conducted in an effective and appropriate manner.

Preventive maintenance training materials are documented and available.

Training conducted is documented correctly and training records are updated and easily available.

Training is relevant to equipment, tools, materials, and processes at the workstation.

Cross- training is provided when appropriate.

Training and training documentation meet all company and regulatory requirements.

#### Perform all housekeeping to maintain production schedule

Tools are stored in proper location.

Materials are kept in a safe manner.

Unsafe conditions are identified and reported promptly.

Corrective action is taken to correct unsafe conditions.

Workstation is clean and clear of safety hazards.

Scheduled housekeeping inspections are passed.

Workstation is organized to maximize efficiency.

All appropriate safety equipment is present and in proper working order.

Describes what a worker needs to know or be able to do to perform the critical work function

### ACADEMIC AND EMPLOYABILITY SKILLS

Skill	overall destra	ore or or est ci	of .go <sup>5</sup> Complexity Dimension	Complexity Subdimension	ORIZE CELEBOTE
Math	NA	L	Complexity of mathematics content	Number sense and computation Geometry, measurement, and spatial sense Complexity of data analysis, statistics, and probability Functions and algebraic thinking Complexity of representation and communication	NA NA NA NA
			Complexity of problem solving	Mathematical methods Mathematical reasoning Mathematical tools	NA NA NA
Science	NA	L	Complexity of scientific inquiry	Design Use of evidence	NA NA
			Complexity of understanding the nature of science	Unifying concepts and processes	NA
			Complexity of core scientific content	Physical science Life science Earth and space science	NA NA NA
			Complexity of applied science	Science and technology Science in personal and social perspective	NA NA
Reading M	М	М	Complexity of text		М
			Complexity of reading skills Complexity of reading purpose		M M
Writing L	L	L	Complexity of text	Complexity of text	M
			Complexity of writing product	Type of product	М
				Organization Elaboration	L M
			Complexity of writing process	Writing development To inform To persuade	L M L
Listening	L	L M	Complexity of communication	Content complexity	M
				Demands on attention Communication indirectness	M L
			Barriers to communication	Limitations on interaction	L
				Distractions	М
peaking	L	М	Complexity of communication	Content complexity	М
				Tact and sensitivity required Communication indirectness	L L
			Context demands	Diversity of audience	М
			Context demands	Constraints on preparation	M
				Distractions Listener resistance	M L
Jsing	L	L	Complexity of technology application	Complexity of equipment or technology	М
nformation	_	=	complexity of teermotogy application	Complexity of applications	М
and Com- munications				Training time constraints	L
Technology			Frequency of technology change	New learning required	М
Gathering and	M	M	Difficulty of information gathering	Amount of information Number and variety of sources	M
Analyzing				Resourcefulness needed	M M
Information			Complexity of analysis	Complexity of information and analysis  Need to evaluate source information  Lack of analysis guidelines	M M

#### ACADEMIC AND EMPLOYABILITY SKILLS

Skill	Overall delity	ore oreginative	Strict <sup>5</sup> Complexity Dimension	Complexity Subdimension	Configuration M
Analyzing and Solving	М	М	Problem complexity	Problem uniqueness or difficulty Number and range of problems	M M
Problems			Solution complexity	Number and complexity of possible solutions	М
Making Decisions and	L	L	Degree of judgment or inference required	Lack of guidance or precedents Integration difficulty Quantity or ambiguity of risks and consequences	L M M
Judgments			Individual decision-making responsibility	Accountability and autonomy Absence or ambiguity of rules or policy constraints	M L
Organizing and Planning	L	М	Complexity of plans	Goal complexity or ambiguity Flexibility required Resource coordination required Scope and effects of planning	L M M
			Constraints on planning	Lack of guidelines Lack of feedback Constraints on resource availability	L L M
Using Social Skills	L	М	Complexity of social interactions	Diversity Structure or protocol required Tact and sensitivity required	M L L
Adaptability	L	L	Degree of adaptability required  Difficulty of adapting	Frequency of change Unpredictability of change Lack of support for change	M M L
Working in Teams	L	М	Degree of collaboration required	Task interdependence	М
			Team member heterogeneity  Goal or role ambiguity	Team diversity  Lack of clarity or support for team goals Lack of clarity or stability of responsibilities	M L L
Leading Others	NA	М	Work challenges People challenges	Challenges to goal attainment Work structuring requirements Scope and complexity of leadership responsibility Coaching or monitoring needs	NA NA NA
Building Consensus	NA	L	Consensus process inhibitors	Conflict management needs  Number and diversity of stakeholders Ambiguity of goals Lack of organizational support, incentives, or consensus leadership High consensus standard	NA NA NA NA
			Difficulty of issues requiring consensus	Complexity of issues Contentiousness of issues Lack of opportunities for agreement	NA NA NA
Self and Career Develop-	NA	L	Need for learning and development  Limitations on learning and development	Self and career development requirements  Time, resource, or support constraints	NA NA
ment			opportunities	Application constraints	NA

Overall complexity ratings: The *overall* level of complexity required in a skill in order to perform the critical work function. *Scale*: H=high complexity: M=moderate complexity: and L=low complexity. Two separate ratings are provided: one for *workers* (entry-level up to first-line supervisors) and the other for supervisors (first-line supervisors). In some cases, the overall complexity rating was NA (Non-Applicable). This means that this skill was deemed not to be needed to perform this given critical work function, so no complexity rating was assigned.

Complexity Subdimension ratings: These are complexity level ratings for individual aspects of the particular skill. *Scale*: H=high complexity: M=moderate complexity: and L=low complexity. At this time, these ratings are provided for workers only. In some cases, the subdimension complexity rating was NA (Non-Applicable). This means that this *particular dimension* of the skill was deemed not to be needed to perform this given critical work function, so no complexity rating was assigned.

Describes what a worker needs to know or be able to do to perform the critical work function

#### OCCUPATIONAL AND TECHNICAL KNOWLEDGE AND SKILLS

These are the technical knowledge and skills needed to perform the critical work function.

Skill Category	Specific Knowledge and Skills	Specific Knowledge and Skills
Mainte- nance Process	A. Knowledge of equipment to be maintained and monitored to ensure it operates correctly.     B. Skill in troubleshooting to identify a problem with equipment.     C. Skill in following preventive maintenance schedules.     D. Knowledge of job specific guidelines or collective bargaining agreement that affect maintenance.     E. Skill in repairing and maintaining machines or tools.     F. Knowledge of the moving parts of equipment.	G. Skill in recognizing wear and tear on equipment components. H. Knowledge of the equipment instrumentation to correctly diagnosis equipment system status.  I. Knowledge of the procedures for logging repairs and work order requests. J. Knowledge of the most common causes of failure of equipment to diagnosis problem quickly. K. Knowledge of what the equipment alarms mean. L. Skill in making on-process adjustments during production.
Mainte- nance Tools and Equipment	A. Knowledge of materials management to know what is recyclable and what is not.      B. Skill in using appropriate maintenance tools to maintain machines.	C. Knowledge of how to use monitoring or diagnostic devices to find out when equipment is operating correctly.
Documen- tation of Mainte- nance	A. Knowledge of statistical methods charts to ensure that equipment is producing a quality product.     B. Knowledge of forms and procedures for correctly documenting processes (e.g., preventative maintenance forms).     C. Knowledge of diagrams, schematics, manuals, and specifications to understand how to repair equipment.	D. Skill in documenting repairs, replacement parts, problems and corrective actions to maintain log to determine patterns of operation.  E. Skill in reviewing maintenance log/checklist to ensure that recommended preventative procedures are followed.
Safety	A. Knowledge of set-up to verify machine safety.  B. Knowledge of safety procedures to prevent accidents.  C. Knowledge of how to use and store hazardous materials and chemicals (e.g., compliance with MSDS)  D. Knowledge of Lock out/Tag out policies and procedures.	E. Skill in visually inspecting equipment to ensure safety compliance before operating.     F. Skill in identifying and reporting unsafe work conditions.     G. Knowledge of materials management to know what is recyclable and what is not.
Training	A. Skill in delivering training.     B. Knowledge of how to plan, prepare, and present structured on-the-job-training.	C. Skill in conducting training on the use of safety equipment, such as fire extinguisher, eye-flush bottles, and first aid kits.      D. Knowledge of the certification/license requirements to operate specific equipment.

	Critical Work Function	n: Maintain equipment, tools and workstations
Knowledge/skill	Mean Importance	Examples
Using Information and Communication Technology	3.43 	Use Time Management System to schedule preventive maintenance based on production hours  Enter data into scheduled maintenance program using the computer  Use PC to document history of maintenance  Access documentation and log books electronically to determine maintenance schedules and procedures  Use an automated system to monitor machine parameters to ensure quality output
Gathering and Analyzing Information	3.25	Gather information regarding improper working equipment to be fixed and communicate to supervisors  Perform a walk-through equipment inspection to monitor equipment  Use maintenance instruction books and schedule logs to maintain machinery  Review machine maintenance schedules to ensure machine is available when needed  Review records of parts suppliers who can get stock parts in the least amount of down time
Analyzing and Solving Problems	3.63	Identify specific areas of problematic machinery to troubleshoot for problems  Identify specific parts or assemblies that require above average maintenance  Analyze machine repair logs to help determine the cause of equipment problems  Evaluate equipment to ensure that it is in good working order before the start of each day  Visually inspect tools and equipment for possible wear and inform supervisor of needed repairs
Making Decisions and Judgments	3.59	Determine if equipment is operating properly  Determine availability of equipment retooling to fulfill production requirements  Determine preventive maintenance schedule in accordance with production schedule  Determine if equipment maintenance will impact production schedule
Organizing and Planning	3.28	Organize work area to improve efficiency Plan training activities to minimize production downtime
Using Social Skills	3.38	needed  Communicate with workers in a positive way in order to convince them of the need for regular, scheduled preventive maintenance  Provide tactful feedback to co-workers on housekeeping of the work area  Interact with trainees in a friendly manner to provide training
Adaptability	3.22	Revise workstation equipment to meet new job requirements  Change to new equipment and retrain on new methods and procedures in order to meet the new challenge

	Use a different machine tool to compensate for an unexpected tool breakage
	Change schedules to adapt to production needs, while not sacrificing equipment efficiency
Working in Tooms	3.07 Team with fellow employees to accomplish better housekeeping and schedule improvements
Working in Teams	Work with maintenance personnel on problem solving/troubleshooting
	Team with new employees to cross-train maintenance jobs
	Work with co-workers to resolve production issues
	vvoix with 60 workers to resolve production issues
Leading Others	2.70 Influence others by example to maintain clean and neat workplace
	Inspire production workers to maintain proper tooling storage in order to eliminate searching
	Train others on the routine for maintaining equipment
	Influence others to perform preventive maintenance and repairs
	Work with team members to determine the training needed to achieve measurable improvements in
Building Consensus	2.45 productivity and quality
	Persuade others to ensure equipment is operating correctly and good housekeeping is maintained
	Facilitate agreement on machine maintenance schedule in order to minimize production impact
	Resolve team member conflicts over work station organization in order to create uniform set-up
	Create agreement on the format of maintenance logs to ensure consistency
Self and Career Development	2.66 Acquire new skills necessary to operate high technology equipment
•	Acquire training in set-up and maintenance to improve your worth as an employee
	Attend training on new machines to improve skill base
	Learn new skills related to all parts of the production process
Consolving	2.07 Comment have a second of second or second of second or second of second or second
Speaking	2.97 Suggest how a co-worker can improve work station efficiency  Express concerns to management about equipment conditions
	Provide feedback on machine condition in order to evaluate optimum usage
	Notify maintenance to let them know about a machine problem
	Communicate to co-workers about a maintenance plan for a new process
Listening	3.11 Receive maintenance instructions and understand them
	Listen to the sound a machine makes to determine if it functions correctly
	Listen to directions given in the correct operation of the equipment
	Listen to details of vendor-suggested maintenance program for their equipment
	Listen to machine operator in order to understand what part of the process is causing the most
	downtime

	l is	sten to concerns of maintenance staff with regard to preventive maintenance schedules and
		oduction schedules
	Pi	oddolloff ddfioddiod
Writing	3.55 W	rite out repair order requests
		rite reports on troubleshooting results on new equipment
	W	rite comprehensive safety standards for unique tools and machines
	Do	ocument maintenance and repair history of equipment
	Co	omplete shift-to-shift logs
Reading	4.04 Re	ead maintenance manuals in order to troubleshoot problems
	Re	ead equipment manuals to determine proper preventive maintenance procedures, lubricants and
	rej	placement parts
	Re	ead machine manuals in order to set up equipment and troubleshoot
		ead and understand all gauges on equipment
		eview maintenance schedule in order to assure upkeep
	Re	eview procedures for programming diagnostics on computer drive machine equipment
Math		etermine volume of coolant and oils
		easure liquid quantities
	Es	stimate repair time for equipment
		easure torque specifications and spec tolerances to properly maintain and use equipment
	Ca	alculate scheduled down-times for machine maintenance
Science		nderstand the mechanical principles of machinery
		nowledge of the chemical with which you are working
		nderstanding of chemicals so as to properly store dangerous materials and chemicals
	Ur	nderstanding why an ESD strap must be correctly grounded at the workstation

#### **P3**

## Critical Work Function: Maintain a safe and productive work area.

#### Critical work functions

describe the major responsibilities involved i<mark>n</mark> carrying out a concentration

#### **Key Activities**

#### **Key activities** are the duties and tasks involved in carrying out a critical work function

#### Performance Indicators

**Performance indicators** correlate to the key activities. The performance indicators provide information on how to determine when someone is performing each key activity competently

#### Perform environmental and safety inspections

Potential hazards in the work are identified, reported, monitored.

Corrective action is taken to correct potential hazards.

Health, safety and environmental documentation and policies are thoroughly and regularly reviewed. Inspections meet all relevant, health, safety, and environmental laws and regulations. Inspections are done according to company schedule and procedures.

Inspections are documented.

Inspection records are stored correctly.

#### Perform emergency drills and participate in emergency response teams

Training and certification on relevant emergency and first aid procedures is complete and up to date. Emergency response complies with company and regulatory policies and procedures.

Emergency drills and incidents are documented promptly according to company and regulatory procedures.

#### Identify unsafe conditions and take corrective action

Conditions that present a threat to health, safety and the environment are identified, reported, and documented promptly.

Corrective actions are identified.

Appropriate parties are consulted about corrective actions.

Corrective actions are taken promptly according to company procedures.

Ongoing safety concerns are tracked and reported until corrective action is taken.

#### Provide safety orientation for other employees

Orientation covers all topics and procedures needed to facilitate employee safety.

Orientation makes clear the need and processes for employees to raise safety concerns, ask questions, and receive additional training.

Orientation is documented according to company requirements.

Orientation meets all relevant laws, policies, and regulations.

Safety training is delivered regularly.

#### Concentrations

are the major areas of frontline work covering families of related jobs. Separate standards were identified for each concentration.

Describes what a worker needs to know or be able to do to perform the critical work function

### ACADEMIC AND EMPLOYABILITY SKILLS

Skill	Overall deficts	ot oreign eith	Complexity Dimension	Complexity Subdimension	Ortigia de Mon	
Math	NA	L	Complexity of mathematics content	Number sense and computation Geometry, measurement, and spatial sense Complexity of data analysis, statistics, and probability Functions and algebraic thinking Complexity of representation and communication	NA NA NA NA	
			Complexity of problem solving	Mathematical methods Mathematical reasoning Mathematical tools	NA NA NA	
Science	L	L	Complexity of scientific inquiry	Design Use of evidence	L L	
			Complexity of understanding the nature of science	Unifying concepts and processes	L	
			Complexity of core scientific content	Physical science Life science Earth and space science	M NA NA	
			Complexity of applied science	Science and technology Science in personal and social perspective	L NA	
Reading	М	М	Complexity of text Complexity of reading skills Complexity of reading purpose		M M M	
Vriting	L	М	Complexity of text	Complexity of text	М	
			Complexity of writing product	Type of product Organization Elaboration	M M M	
			Complexity of writing process	Writing development To inform To persuade	L M L	
Listening M	М	М	Complexity of communication	Content complexity Demands on attention Communication indirectness	M M L	
			Barriers to communication	Limitations on interaction Distractions	M M	
Speaking	М	М	Complexity of communication	Content complexity Tact and sensitivity required Communication indirectness	M M L	
			Context demands	Diversity of audience Constraints on preparation Distractions Listener resistance	M M M	
Using Information and Com-	L	L L	L L	Complexity of technology application	Complexity of equipment or technology Complexity of applications Training time constraints	L L M
munications Technology			Frequency of technology change	New learning required	М	
Gathering and Analyzing	М	М	Difficulty of information gathering	Amount of information Number and variety of sources Resourcefulness needed	M M M	
Information			Complexity of analysis	Complexity of information and analysis  Need to evaluate source information  Lack of analysis guidelines	M M M	

#### ACADEMIC AND EMPLOYABILITY SKILLS

Skill	Overall deficies	ot ore of the strate	St. Complexity Dimension	Complexity Subdimension	constitution to the state of th
Analyzing	М	М	Problem complexity	Problem uniqueness or difficulty	M
and Solving			, , ,	Number and range of problems	М
Problems			Solution complexity	Number and complexity of possible solutions	М
Making	М	L	Degree of judgment or inference required	Lack of guidance or precedents	М
Decisions				Integration difficulty  Quantity or ambiguity of risks and consequences	M
and Judgments				Quantity or ambiguity of risks and consequences	M
,			Individual decision-making responsibility	Accountability and autonomy	М
				Absence or ambiguity of rules or	
				policy constraints	L
Organizing	L	М	Complexity of plans	Goal complexity or ambiguity	L
and Planning				Flexibility required	M
				Resource coordination required	M
				Scope and effects of planning	М
			Constraints on planning	Lack of guidelines	L
				Lack of feedback	
				Constraints on resource availability	М
Using Social	М	м	Complexity of social interactions	Diversity	м
Skills	141	IVI	complexity of social interactions	Structure or protocol required	M
Skittis				Tact and sensitivity required	M
Adaptability	L	L	Degree of adaptability required	Frequency of change	М
			Difficulty of adapting	Unpredictability of change	М
			2	Lack of support for change	L
Working in Teams	L	М	Degree of collaboration required	Task interdependence	М
			Team member heterogeneity	Team diversity	М
			Goal or role ambiguity	Lack of clarity or support for team goals	L
			Godt of Fole unbiguity	Lack of clarity or stability of responsibilities	<u> </u>
Landina	A4		Work shallonges	Challenges to goal attainment	14
Leading Others	М	М	Work challenges	Challenges to goal attainment Work structuring requirements	<u>М</u> М
Others				Scope and complexity of leadership responsibility	NA NA
				scope and complexity of teadership responsibility	11/4
			People challenges	Coaching or monitoring needs	NA
				Conflict management needs	M
Building	L	L	Consensus process inhibitors	Number and diversity of stakeholders	L
Consensus	=	_	r	Ambiguity of goals	Ī
				Lack of organizational support, incentives, or	
				consensus leadership	L
				High consensus standard	М
			Difficulty of issues requiring consensus	Complexity of issues	L
			22, 2	Contentiousness of issues	M
				Lack of opportunities for agreement	M
Self and Career	L	L	Need for learning and development	Self and career development requirements	М
Develop-			Limitations on learning and development	Time, resource, or support constraints	М
ment			opportunities	Application constraints	<u>"</u>
				· ·	

Overall complexity ratings: The overall level of complexity required in a skill in order to perform the critical work function. Scale: H=high complexity; M=moderate complexity; and L=low complexity. Two separate ratings are provided: one for workers (entry-level up to first-line supervisors) and the other for supervisors (first-line supervisors). In some cases, the overall complexity rating was NA (Non-Applicable). This means that this skill was deemed not to be needed to perform this given critical work function, so no complexity rating was assigned.

Complexity Subdimension ratings: These are complexity level ratings for individual aspects of the particular skill. Scale: H=high complexity; M=moderate complexity; and L=low complexity. At this time, these ratings are provided for workers only. In some cases, the subdimension complexity rating was NA (Non-Applicable). This means that this particular dimension of the skill was deemed not to be needed to perform this given critical work function, so no complexity rating was assigned.

Describes what a worker needs to know or be able to do to perform the critical work function

#### OCCUPATIONAL AND TECHNICAL KNOWLEDGE AND SKILLS

These are the technical knowledge and skills needed to perform the critical work function.

Skill Category	Specific Knowledge and Skills	Specific Knowledge and Skills
Safety Procedures	A. Knowledge of how to locate and use Material Safety Data Sheets (MSDS).     B. Knowledge of company first aid or first response procedures.     C. Knowledge of material handling techniques to safely move materials.     D. Knowledge of how to be proactive in responding to a safety concern and document occurrences.     E. Knowledge of emergency exits.     F. Knowledge of various emergency alarms and procedures.	G. Knowledge of clean-up procedures for spills.  H. Knowledge of Lock Out/Tag Out requirements.  I. Knowledge of how to inspect work area and report possible safety risks.  J. Knowledge of machine functions to determine if all safeguards are operational.  K. Knowledge of safety procedures in case of smoke or chemical inhalation.  L. Knowledge of procedures for handling hazardous materials.
Personal Safety	A. Skill in identifying and reporting unsafe conditions.      B. Knowledge of safety issues related to hazardous materials.      C. Knowledge of housekeeping needed to maintain a safe work environment.	D. Skill in determining if all safety guards are in place prior to machine operation.      E. Knowledge of clothing and personal protective equipment (PPE) that should be worn to ensure safety.
Safety Policies and Regu- lations	A. Knowledge of basic filing procedures to properly store inspection records.      B. Knowledge of safety requirements and environmental regulations related to performing inspections.      C. Knowledge of policies and procedures needed to perform audits and train employees about hazardous conditions.	D. Knowledge of company safety standards for handling potential hazards.     E. Knowledge of how to safely store, identify, and use hazardous materials and pressurized vessels.     F. Knowledge of OSHA and other health and safety requirements as applied to the workplace.
Corrective Action	A. Knowledge of what constitutes an unsafe condition to be able to take corrective actions.      B. Knowledge of required corrective action procedures.	C. Knowledge of accident documentation procedures.
Safety Training	A. Skill in developing and/or delivering safety training per guidelines.	B. Knowledge of health and safety education requirements.

C	ritical Work Function	on: Maintain a safe and productive work area
Knowledge/skill	Mean Importance	Examples
Using Information and Communication	3.42	Input all safety and health training into data base to guarantee proper documentation  Use computerized data collection to identify accident trends/areas that need to be evaluated for
Technology		correction and elimination
redifficiegy		Use computers to access training programs
		Use PowerPoint presentations to conduct safety orientations
		Use computer to track safety training
		occompater to track carety training
Gathering and Analyzing Information	3.13	Gather, analyze and compare present safety conditions to past
, ,		Visually inspect work area for possible safety hazards
		Collect information on safety audits and accident logs to identify improvement opportunities and
		corrective actions
		Gather information on who is in need of safety training
		Gather information from injury reports to determine repeated injuries from dangerous equipment in
		order to make corrections
Analyzing and Solving Problems	3.34	Identify safety issues to recommend corrective actions
		Select proper personnel protective equipment for the job to prevent injuries
		Analyze safety inspection reports to help implement a corrective action plan
		Identify areas or tasks where most injuries occur to suggest modifications to process, layout or job rotations in order to eliminate injuries
Making Decisions and Judgments	3.65	Decide on the list of priorities necessary for training of personnel in emergency response situations
		Determine that all safety equipment and guards are in place
		Identify unsafe conditions
		task
		Determine the frequency of safety training and drills
Organizing and Planning	3.47	Organize safety drills to ensure worker safety
		Plan and organize safety and environmental inspections in order to prevent accidents
		Plan the appropriate timing of emergency drills
		Plan emergency drills to prepare for threats to health or safety
		Communicate to the production supervisor that a safety issues exists and critical process must be
Using Social Skills	3.55	stopped until a remedy is found
		Interact with peers to share info on emergency drills/procedures
		Interact with new employees on importance of safe work environment in order to make a positive
		impact

	Give feedback to a co-worker in order to communicate a safer way to perform an operation or task
Adaptability	3.13 Change method of production to achieve safer outcomes
Adaptability	Change to a new safety procedure in order to comply with new safety law requirements
	Change the production process to temporarily work around an unsafe area or condition
	Be able to respond to different types of emergencies
Working in Tooms	3.58 Work with co-workers to identify and report unsafe conditions
Working in Teams	· ·
	Work with all team members to conduct effective fire/safety/emergency drills
	Meet and discuss conditions that are thought to be unsafe in order to make everyone aware
	Correct potential safety issues when discovered, to make co-workers aware of how issues should be
Leading Others	3.55 addressed
	Encourage a more participative approach to safety issues
	Lead by example to show no repercussion of notification of possible unsafe conditions
	Lead others to work safely by emphasizing safe practices
	Build a common theme of "safety-first" among workers to ensure a safe work environment
Puilding Concessor	2.00 Explain how to correct an upgete condition without effecting the effected workers
Building Consensus	3.00 Explain how to correct an unsafe condition without offending the affected workers
	Review potential or existing safety concerns and build consensus by discussing potential actions needed to resolve them
	Facilitate agreement on safety procedures in order to assure entire team follows the agreed-upon
	process
	Create consensus upon emergency procedures and specific people's responsibilities
	Build consensus on what level of safety training is needed
Self and Career Development	2.93 Learn about hazardous material specs to prevent injury
Sen and Career Development	Attend in-house operator safety seminars
	Identify learning opportunities in environmental laws and technology to improve safety
	Acquire CPR and first-aid training
	program of the and more and manning
	Present safety policies and procedures to other employees in order to understand the importance of
Speaking	3.48 safety
	Express concerns to management about unsafe work environment
	Present accurate and cogent presentations to new hires and trainees in safety subjects
	Present safety training to co-workers when new work processes are implemented
	Discuss environmental issues with supervisor in order to avoid accidents and unsafe conditions

Listening	3.44 Listen to descriptions of safety policies and procedures in order to avoid accidents	
	Listen to the concerns of the employee in order to identify ergonomics improvements need	ed
	Receive feedback from employees as it pertains to safety in a respectful and attentive way	
	Listen to employees identifying potential safety hazards and take corrective actions	
Writing	3.21 Post written warnings about unsafe conditions	
- vviiding	Write accurate accident injury reports	
	Document clear procedures for safety practices	
	Document equipment safety checks in safety log book	
	Document safety incident and training orientation	
	Document corrective actions regarding safety	
Reading	3.63 Read warning labels to identify potentially hazardous materials	
Reading	Read information on emergency procedures	
	Read MSDS forms to protect self and others	
	Read company safety policies and procedures	
	Read machinery and product instructions in order to safely use them	
	Read safety and environmental standards to perform inspections	
	Trouble dates) and or mornion and dates to position in the position of	
Math	2.31 Tabulate safety incidents	
	Calculate the safe volumes of contamination	
	Calculate the sale volumes of contamination	
	Measure the distances needed to maintain safe tolerances in the workplace	
	Measure the distances needed to maintain safe tolerances in the workplace  Measure content of lead in painted surfaces	
	Measure the distances needed to maintain safe tolerances in the workplace  Measure content of lead in painted surfaces  Calculate production quantities against accident rates to ensure that demand doesn't create	e unsafe
	Measure the distances needed to maintain safe tolerances in the workplace  Measure content of lead in painted surfaces	e unsafe
Saionea	Measure the distances needed to maintain safe tolerances in the workplace  Measure content of lead in painted surfaces  Calculate production quantities against accident rates to ensure that demand doesn't create workplace  Understanding of how the body is impacted by ergonomics in order to make workstation measurements.	
Science	Measure the distances needed to maintain safe tolerances in the workplace  Measure content of lead in painted surfaces  Calculate production quantities against accident rates to ensure that demand doesn't create workplace  Understanding of how the body is impacted by ergonomics in order to make workstation makes comfortable and safe	
Science	Measure the distances needed to maintain safe tolerances in the workplace  Measure content of lead in painted surfaces  Calculate production quantities against accident rates to ensure that demand doesn't create workplace  Understanding of how the body is impacted by ergonomics in order to make workstation makes against accident rates to ensure that demand doesn't create workplace  Understanding of how the body is impacted by ergonomics in order to make workstation makes against accident rates to ensure that demand doesn't create workplace	
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Concentrations

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areas of frontline work cover-

ing families of

Separate stan-

tified for each concentration.

dards were iden-

related jobs.

#### **P4**

#### Critical Work Function: Maintain quality and implement continuous Critical work functions improvement processes.

describe the major responsibilities involved in carrying out a concentration

### **Key Activities**

#### **Key activities** are the duties and tasks involved in carrying out a critical work function

#### **Performance Indicators**

**Performance indicators** correlate to the key activities. The performance indicators provide information on how to determine when someone is performing each key activity competently

#### Perform periodic internal quality audit activities

All audit forms are completed correctly in a timely manner.

Forms are forwarded to the correct parties.

Audit data is relevant and correct.

Conformances to quality standards are properly assessed and documented.

When appropriate, audit includes observation of operation to ensure performance meets specifications. Audit is performed in accordance with company and other required schedules and procedures.

#### Check calibration of gauges and other data collection equipment

Calibration schedule is implemented according to specifications.

Instrument certification is checked both by reviewing documentation and through careful observation during

Instruments that are out of calibration are immediately recalibrated or referred to the appropriate parties for recalibration or repairs.

#### Suggest continuous improvements

Potential improvements are generated through observation and data analysis.

Suggestions are communicate measurable and data-driven benefits to the company, its customers and employees.

Suggestions are made according to proper procedures and documentation. Suggestions show that all data was reviewed prior to making recommendation.

#### Inspect materials at all states of process to determine quality or condition

Sampling and inspection occur according to schedule and procedures. Inspection tools and procedures are selected and used correctly.

Materials are inspected against correct specifications.

Materials that do not meet specification are correctly identified.

Corrective action is taken on out-of specification material. Inspection results are properly documented.

Inspection results are reported to correct parties.

#### Document the results of quality tests

Data forms are checked to ensure that they are complete and accurate.

Information is evaluated and interpreted correctly.

Data is forwarded to correct parties.

Correct analytical tools are selected and used properly.

#### Make adjustments to restore or maintain quality

Appropriate corrective actions are identified and approvals received when needed.

Adjustments are made to eliminate deviations and bring the process back into control.

Adjustments are made in a timely manner.

Adjustments are properly documented.

**About the Work** 

Describes what a worker needs to know or be able to do to perform the critical work function

### ACADEMIC AND EMPLOYABILITY SKILLS

Skill	Oreight destrates	out of death	Complexity Dimension	Complexity Subdimension	Original de Mon
Math	М	М	Complexity of mathematics content	Number sense and computation Geometry, measurement, and spatial sense Complexity of data analysis, statistics, and probability Functions and algebraic thinking Complexity of representation and communication	M M M M
			Complexity of problem solving	Mathematical methods Mathematical reasoning Mathematical tools	M M M
Science	NA	L	Complexity of scientific inquiry	Design Use of evidence	NA NA
			Complexity of understanding the nature of science	Unifying concepts and processes	NA
			Complexity of core scientific content	Physical science Life science Earth and space science	NA NA NA
			Complexity of applied science	Science and technology Science in personal and social perspective	NA NA
Reading	М	М	Complexity of text Complexity of reading skills Complexity of reading purpose		M M M
Writing	М	М	Complexity of text	Complexity of text	М
			Complexity of writing product	Type of product Organization Elaboration	M M M
			Complexity of writing process	Writing development To inform To persuade	M M M
Listening	L	М	Complexity of communication	Content complexity Demands on attention Communication indirectness	M M L
			Barriers to communication	Limitations on interaction Distractions	L M
Speaking	М	М	Complexity of communication	Content complexity Tact and sensitivity required Communication indirectness	M M L
			Context demands	Diversity of audience Constraints on preparation Distractions Listener resistance	M M M
Using Information and Com-	мм	М	Complexity of technology application	Complexity of equipment or technology Complexity of applications Training time constraints	M M M
munications Technology			Frequency of technology change	New learning required	М
Gathering and Analyzing	М	М	Difficulty of information gathering	Amount of information Number and variety of sources Resourcefulness needed	M M M
Information			Complexity of analysis	Complexity of information and analysis  Need to evaluate source information  Lack of analysis guidelines	M M M

#### ACADEMIC AND EMPLOYABILITY SKILLS

Skill	Ore compains	ode's Overall destrict	Strict's Complexity Dimension	Complexity Subdimension	Constitution of the consti
Analyzing and Solving	M	М	Problem complexity	Problem uniqueness or difficulty Number and range of problems	M M
Problems			Solution complexity	Number and complexity of possible solutions	М
Making Decisions and	Decisions		Degree of judgment or inference required	Lack of guidance or precedents Integration difficulty Quantity or ambiguity of risks and consequences	M M M
Judgments			Individual decision-making responsibility	Accountability and autonomy Absence or ambiguity of rules or policy constraints	M M
Organizing and Planning	М	М	Complexity of plans	Goal complexity or ambiguity Flexibility required Resource coordination required Scope and effects of planning	M M M
			Constraints on planning	Lack of guidelines Lack of feedback Constraints on resource availability	M M M
Using Social Skills	М	М	Complexity of social interactions	Diversity Structure or protocol required Tact and sensitivity required	M M M
Adaptability	М	М	Degree of adaptability required  Difficulty of adapting	Frequency of change Unpredictability of change Lack of support for change	M M M
Working in Teams	М	М	Degree of collaboration required  Team member heterogeneity  Goal or role ambiguity	Task interdependence  Team diversity  Lack of clarity or support for team goals Lack of clarity or stability of responsibilities	M M M
Leading Others	М	М	Work challenges  People challenges	Challenges to goal attainment Work structuring requirements Scope and complexity of leadership responsibility Coaching or monitoring needs	M M NA NA
Building Consensus	М	М	Consensus process inhibitors	Conflict management needs  Number and diversity of stakeholders Ambiguity of goals Lack of organizational support, incentives, or consensus leadership High consensus standard	M M M
			Difficulty of issues requiring consensus	Complexity of issues Contentiousness of issues Lack of opportunities for agreement	M M M
Self and Career	М	М	Need for learning and development	Self and career development requirements	M
Develop- ment			Limitations on learning and development opportunities	Time, resource, or support constraints Application constraints	M L

Overall complexity ratings: The overall level of complexity required in a skill in order to perform the critical work function. Scale: H=high complexity: M=moderate complexity: and L=low complexity. Two separate ratings are provided: one for workers (entry-level up to first-line supervisors) and the other for supervisors (first-line supervisors). In some cases, the overall complexity rating was NA (Non-Applicable). This means that this skill was deemed not to be needed to perform this given critical work function, so no complexity rating was assigned.

Complexity Subdimension ratings: These are complexity level ratings for individual aspects of the particular skill. Scale: H=high complexity: M=moderate complexity: and L=low complexity. At this time, these ratings are provided for workers only. In some cases, the subdimension complexity rating was NA (Non-Applicable). This means that this particular dimension of the skill was deemed not to be needed to perform this given critical work function, so no complexity rating was assigned.

Describes what a worker needs to know or be able to do to perform the critical work function

#### OCCUPATIONAL AND TECHNICAL KNOWLEDGE AND SKILLS

These are the technical knowledge and skills needed to perform the critical work function.

Skill Category	Specific Knowledge and Skills	Specific Knowledge and Skills
Quality Process	A. Skill in set-up and inspection to improve production and maintain quality.	F. Knowledge of inspections to perform and evaluate process. G. Knowledge of how to fill out inspection sheets.
	Knowledge of how to identify good products and non-conforming products.	H. Knowledge of how to read production documents.  I. Skill in interpreting test results.
	<ul> <li>C. Skill in inspecting materials, and labeling and returning non-conforming materials.</li> </ul>	<ol> <li>Knowledge of basic material specifications and properties to inspect materials.</li> </ol>
	D. Knowledge of company quality assurance procedures.	K. Knowledge of data from check sheets, quality charts and statistical meth-
	E. Knowledge of quality management systems and how to use them to perform quality checks.	ods charts to be able to better control process.  L. Knowledge of corrective actions that need to be reported.
Quality	A. Knowledge of inspection procedures for handling non-conforming	C. Knowledge of test equipment calibration compliance.
Documen- ation	material.  B. Knowledge of how to use route sheets and statistical method charts to	D. Knowledge of how to complete appropriate quality forms.  E. Knowledge of follow-up and reporting procedures to ensure proper com-
tation	document process.	munications.
Continuous	A. Knowledge of new and advanced technology in the industry.	D. Knowledge of statistical methods charts to ensure that process is under
Improve- ment	<ul> <li>B. Knowledge of how to collect and analyze data to recommend improvements.</li> </ul>	control.  E. Knowledge of which parties should be notified of recommended for con-
Process	<ul> <li>C. Knowledge of production system and machinery to suggest process improvements.</li> </ul>	tinuous improvement.  F. Knowledge of the causes of excessive waste and scrap.
Inspection	A. Skill in verifying calibration of inspection equipment.	D. Skill in evaluating the characteristics of a finished product against specifi-
Tools	<ul> <li>Knowledge of how to chose the appropriate analytical methods to inter- pret test data.</li> </ul>	cations.  E. Skill in using hand-held inspection devices to examine materials.
	C. Knowledge of appropriate automated inspection system.	F. Skill in maintaining and storing inspection tools.
Calibration	A. Knowledge of the calibration standards, requirements, and equipment.	B. Knowledge of environmental impact that effect calibration requirements.
Manufac-	A. Knowledge of manufacturing processes and how equipment operates.	C. Knowledge of procedures for handling and storing materials and products
turing Process	<ul> <li>B. Knowledge of specifications and requirements of products being pro- duced.</li> </ul>	D. Knowledge of the basic properties of the materials used in the process.

Critical Work Fu	Critical Work Function: Maintain quality and implement continuous improvement processes			
Knowledge/skill	Mean Importance	Examples		
Using Information and Communication	3.60	Use computer system to track gauge calibration schedules and results of quality checks		
Technology		Use CAD to design better fixtures and processes to produce quality parts in a timely fashion		
		Use calculator to conduct audits and ensure product quality at different stages of the production cycle		
		Use PC to create and maintain audit documentation		
		Use Access data base to collect field and in-house data in order to identify failure trends and point to		
		areas for improvement opportunities		
Gathering and Analyzing Information	3.94	Gather information from product samples to monitor conformance to specifications and to determine if machine adjustments are necessary		
		Verify that all fixtures, tools, blueprints, and process sheets are current and conform to latest revision		
		Solicit operator inputs to resolve problems and quality improvements		
		Interpret all spec charts to understand their impact on the final product		
		Check all inspection equipment		
Analyzing and Solving Problems	3.81	Anticipate future quality control problems and make proactive adjustments in order to maintain quality products		
		Keep records of all jobs to see if all stations uphold top quality at all times		
		Analyze results of quality audits and recommend changes for problem areas		
		Take part in problem solving/solution implementation activities		
Making Decisions and Judgments	3.91	Determine when production must be stopped if it isn't meeting specifications		
		Identify the corrective action necessary to bring a process back into control		
		Decide if calibration is out-of-date and when recalibration is required		
		Determine when and where to inspect or audit process for quality of product or process to meet		
		customer requirements		
		Decide if a product is within tolerances		
Organizing and Planning	3 53	Organize and maintain measuring equipment calibrations		
g	3.00	Organize team to review quality stats and brainstorm possible solutions		
		Plan periodic adjustments to machinery to recalibrate due to vibration		
		Schedule inspection of production at all critical stages		
Using Social Skills	3.56	Conduct audits in a non-threatening manner by explaining the reason for the audit		
		Meet with fellow employees and discuss business needs in a professional manner		
	•			

	Communicate the importance of quality and customer satisfaction in order to maintain a competitive edge  Communicate results of audits to employees in a tactful way to bring awareness of areas for improvement
Adaptability	3.63 Change production and inspection method to improve product quality
	Show receptivity to alternative process methods that may improve productivity and reduce scrap
	Adapt behavior to accommodate quality requirements on different lines and with different products
	Adapt to new communication technologies to assure production and quality delivery
Working in Teams	3.90 Participate with other departments in solving quality issues
	Work with all team members to develop new ideas for process improvements
	Collaborate with team members to integrate new processes and improvements
	Work on cross-functional teams to identify continuing improvement needs
Leading Others	3.52 Show co-workers production methods to improve quality and give credit to the right employee
	Lead co-workers to positive work improvement ideas and follow up on them
	Encourage co-workers to check parts for quality
	Coach a co-worker on techniques that improve quality results
	Influence line workers to take appropriate corrective actions as identified
Building Consensus	Build consensus by brainstorming all potential C.I. Projects in order to prioritize them and begin 3.41 implementation
	Have all workers collectively agree what is quality, how to define it and express the theme that quality means jobs
	Work with team members to develop consensus on corrective action implementation plan
	Build consensus on the importance of inspection to determine quality or condition  Create agreement that proper documentation of processes will help analyze areas that need
	improvement and provide insight on how to effect positive change
Self and Career Development	3.21 Take a course on quality tools used by the company (e.g., SPC or statistics)
	Attend classes on SPC
	Acquire skills in new quality inspection technology to improve quality
	Increase certifications to help maintain highest level of quality
Speaking	2.24 Participate in discussions/brainsterming appaigns targeted at productivity and quality improvements
Speaking	3.34 Participate in discussions/brainstorming sessions targeted at productivity and quality improvements  Present ideas for continuous improvements calmly and clearly
	Present ideas for continuous improvements calmiy and clearly  Provide feedback on work performance that will maintain and improve performance
	rrovide reedback on work performance that will maintain and improve performance

	Express concerns regarding work processes
	Communicate to the set up person the adjustments needed to bring a process into control
	Communicate to the set up percent the adjustmente headed to shirty a process into control
	Listen to the ideas of others in a non-judgmental manner to realize the greatest gain from the CI
Listening	3.69 process
	Listen to the ideas of others with an open mind
	Receive feedback from supervisor on quality of work in an appropriate way
	Listen to customers to obtain knowledge of product uses
	Listen to employees' concerns over production process
	Listen to suppliers in order to gain knowledge of product development and updates
Writing	3.64 Write test records for quality control and non-conformance reports
	Fill out reject material reports clearly and precisely
	Complete audit forms
	Create detailed log of calibration of gauges and other data collection equipment
Reading	4.00 Review procedures or suggested changes to comment on their effectiveness
Keauing	Read calibration manuals and be able to implement corrective actions
	Read audit reports
	Read vendor publications and training manuals to stay apprised of current developments
	Read shift-to-shift communications to understand what stage the process is in
	Read quality test procedures to test product
Math	3.83 Use math to produce charts on department quality levels
	Perform cost/benefit analysis to determine if a CI idea is cost effective
	Determine if a part is acceptable based on actual vs. dimension/tolerance specifications
	Estimate material usage to ensure adequate supply of materials
	Calculate equipment calibration
Science	2.82 Knowledge of potential hazards of epoxy paints
Ocience	Knowledge of chemical reactions
	Understand principles of chemistry to adjust finishing processes to meet specs
	Conduct air quality test equipment calibration to ensure worker safety

Concentrations

line work cover-

ing families of

Separate standards were iden-

tified for each

concentration.

related jobs.

are the major areas of front-

#### **P5**

#### Critical Work Function: Communicate with co-workers and/or external customers Critical work functions to ensure production meets business requirements.

describe the major responsibilities involved in carrying out a concentration

#### **Key Activities**

#### **Key activities** are the duties and tasks involved in carrying out a critical work function

#### Performance Indicators

Performance indicators correlate to the key activities. The performance indicators provide information on how to determine when someone is performing each key activity competently

#### Communicate safety, training and jobspecific needs

Communication is sufficient to ensure that safety issues are understood and safety practices used. On-the-job issues and concerns are discussed and quickly resolved.

Current and future training issues are identified in a timely way.

Communication demonstrates knowledge of customer and business needs.

Communication is clear and relevant to the situation.

Communication is made in a timely and accurate manner to the correct parties.

Issues are evaluated, tracked and reported back to original communicator.

Communications are tracked and documented, as appropriate.

#### Communicate material specifications and delivery schedules

Communication reflects knowledge of material specifications.

Delivery schedules are clearly communicated.

Communication demonstrates knowledge of customer and business needs.

Communication is clear and relevant to material and delivery issues.

Communication is made in a timely and accurate manner to the correct parties.

Material and delivery issues are evaluated, tracked and reported back to original communicator.

Communications are tracked and documented, as appropriate.

#### Communicate quality requirements, issues and training

Communication reflects knowledge of quality requirements.

Quality issues are raised in a timely way.

Quality issues are addressed in a timely way.

Communication demonstrates knowledge of customer and business needs.

Communication is clear and relevant to quality.

Communication is made in a timely and accurate manner to the correct parties.

Quality issues are recorded, and tracked and reported back to original communicator.

Communications are tracked and documented, as appropriate.

#### Communicate production requirements and product specifications

Communication reflects knowledge of production requirements, levels, and product specifications.

Communication is initiated cross-functionally as required to meet production requirements, product

specifications, or other customer or business needs.

All parties are notified of production issues and problems in a timely way. Communication demonstrates knowledge of customer and business needs.

Communication is clear and relevant to production and products.

Issues are evaluated, tracked and reported back to original communicator.

Communications are tracked and documented, as appropriate.

### **About the Work**

Describes what a worker needs to know or be able to do to perform the critical work function

### ACADEMIC AND EMPLOYABILITY SKILLS

Skill	Operating exists	ot overoll period	Complexity Dimension	Complexity Subdimension	Ontigination
Math	NA	L	Complexity of mathematics content	Number sense and computation Geometry, measurement, and spatial sense Complexity of data analysis, statistics, and probability Functions and algebraic thinking Complexity of representation and communication	NA NA NA NA
			Complexity of problem solving	Mathematical methods Mathematical reasoning Mathematical tools	NA NA NA
Science	NA	L	Complexity of scientific inquiry	Design Use of evidence	NA NA
			Complexity of understanding the nature of science	Unifying concepts and processes	NA
			Complexity of core scientific content	Physical science Life science Earth and space science	NA NA NA
			Complexity of applied science	Science and technology Science in personal and social perspective	NA NA
leading	М	М	Complexity of text Complexity of reading skills Complexity of reading purpose		M M M
/riting	М	М	Complexity of text	Complexity of text	М
			Complexity of writing product	Type of product Organization Elaboration	M M M
			Complexity of writing process	Writing development To inform To persuade	M M M
Listening M	М	Н	Complexity of communication	Content complexity Demands on attention Communication indirectness	M M M
			Barriers to communication	Limitations on interaction Distractions	M M
Speaking	М	Н	Complexity of communication	Content complexity Tact and sensitivity required Communication indirectness	M M M
			Context demands	Diversity of audience Constraints on preparation Distractions Listener resistance	M M M
Using Information and Com- munications Technology	М	М	Complexity of technology application	Complexity of equipment or technology Complexity of applications Training time constraints	M L M
			Frequency of technology change	New learning required	М
Gathering and Analyzing Information	М	M M	Difficulty of information gathering	Amount of information Number and variety of sources Resourcefulness needed	M M M
			Complexity of analysis	Complexity of information and analysis  Need to evaluate source information  Lack of analysis guidelines	M M M

#### ACADEMIC AND EMPLOYABILITY SKILLS

Skill	Overoll deith	oder Overoll desiration	Complexity Dimension	Complexity Subdimension	ond state not be
Analyzing and Solving Problems	L	L	Problem complexity	Problem uniqueness or difficulty Number and range of problems	L M
			Solution complexity	Number and complexity of possible solutions	М
Making Decisions and Judgments	М	L	Degree of judgment or inference required	Lack of guidance or precedents Integration difficulty Quantity or ambiguity of risks and consequences	M M M
			Individual decision-making responsibility	Accountability and autonomy Absence or ambiguity of rules or policy constraints	M M
Organizing and Planning	М	М	Complexity of plans	Goal complexity or ambiguity Flexibility required Resource coordination required Scope and effects of planning	M M M
			Constraints on planning	Lack of guidelines Lack of feedback Constraints on resource availability	M M M
Using Social Skills	М	н	Complexity of social interactions	Diversity Structure or protocol required Tact and sensitivity required	M M M
Adaptability	М	М	Degree of adaptability required  Difficulty of adapting	Frequency of change Unpredictability of change	M M
			Difficulty of adapting	Lack of support for change	M
Working in Teams	М	М	Degree of collaboration required	Task interdependence	М
			Team member heterogeneity	Team diversity	М
			Goal or role ambiguity	Lack of clarity or support for team goals Lack of clarity or stability of responsibilities	M M
Leading Others	М	М	Work challenges	Challenges to goal attainment Work structuring requirements Scope and complexity of leadership responsibility	M M NA
			People challenges	Coaching or monitoring needs Conflict management needs	NA M
Building Consensus	М	М	Consensus process inhibitors	Number and diversity of stakeholders Ambiguity of goals Lack of organizational support, incentives, or consensus leadership High consensus standard	M M M
			Difficulty of issues requiring consensus	Complexity of issues Contentiousness of issues Lack of opportunities for agreement	M M M
Self and	NA	L	Need for learning and development	Self and career development requirements	NA
Career Develop- ment			Limitations on learning and development opportunities	Time, resource, or support constraints Application constraints	NA NA

Overall complexity ratings: The *overall* level of complexity required in a skill in order to perform the critical work function. *Scale*: H=high complexity; M=moderate complexity; and L=low complexity. Two separate ratings are provided: one for *workers* (entry-level up to first-line supervisors) and the other for *supervisors* (first-line supervisors). In some cases, the overall complexity rating was NA (Non-Applicable). This means that this skill was deemed not to be needed to perform this given critical work function, so no complexity rating was assigned.

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Describes what a worker needs to know or be able to do to perform the critical work function

#### OCCUPATIONAL AND TECHNICAL KNOWLEDGE AND SKILLS

These are the technical knowledge and skills needed to perform the critical work function.

Skill Category	Specific Knowledge and Skills	Specific Knowledge and Skills
Quality	A. Knowledge of quality concepts and how to resolve them in a way that meets business requirements.     B. Knowledge of third party quality testing to ensure materials meet specifications.     C. Skill in completing a non-conforming product form to get approval for proper material disposition.	D. Knowledge of material specifications.     E. Skill in interpreting quality requirements, industry standards, and documentation requirements.     F. Knowledge of traceable documentation.
Scheduling	A. Skill in calculating time estimates for jobs.     B. Knowledge of schedules and how to access schedules of customers or suppliers.	C. Knowledge of how to complete a requisition form to order job-related material.
Safety	A. Knowledge of safety issues and practices, including Occupational Safety and Health Administration (OSHA) regulations, to take or recommend action.	B. Knowledge of how to use Material Safety Data Sheets (MSDS).     C. Knowledge of company reporting forms and documents and procedures specific to safety.
Business Policies and Procedures	A. Knowledge of which company forms to use when communicating.     B. Knowledge of company organizational structure to communicate with correct parties.	C. Knowledge of customer and business needs in order to communicate effectively.
Manufac- turing Process	A. Knowledge of product production specifications and productivity requirements.      B. Knowledge of customer requirements.      C. Knowledge of order size and materials requirements.	D. Knowledge of production process to meet business requirements.     E. Knowledge of material tracking and handling procedures.     F. Knowledge of the basic terminology used in the workplace.

Critical Work Function: Communicate with co-workers and/or external customers to ensure production meets business requirements			
Knowledge/skill	Mean Importance Examples		
Using Information and Communication Technology	3.84 Use overhead projectors and computers to train employees in the safe operation of equipment Use phone to communicate with customers on quality and deliver times		
	Post production schedule on Excel spreadsheet to monitor and track progress to commitment		
	Use phone/fax and email to relate material specifications Use computerized reports to share production and quality information with production workers		
Gathering and Analyzing Information	3.48 Gather and analyze data on hazardous process that may become safety concern  Communicate change orders from sales staff to production floor		
	Communicate shift to shift problems and concerns to help ensure efficiency  Gather information on product functionality and materials in order to communicate and address production needs  Gather production quantities and stock amounts to schedule overtime		
Analyzing and Solving Problems	3.57 Analyze production bottlenecks to suggest alternate plans  Review daily quality output stats with team  Identify possible hazards in order to eliminate time loss injury  Analyze material needs to ensure production can be met		
Making Decisions and Judgments	3.29 Determine with the customer any deviations from specs that are acceptable  Determine what communications are needed in order to meet production requirements  Determine the time to completion in order to move product from one station to next  Determine cause of conflict between clients and coworkers and determine corrective action		
Organizing and Planning	3.63 Plan to have operators info-share quality concerns/issues between departments and shifts Organize meetings in order to communicate all production requirements Organize training to meet the needs of the worker in order to maximize results Organize and plan routine communication with customers		
Using Social Skills	Suggest improvements to employees using examples of how to implement them without insulting the 3.94 workers  Encourage cooperation between peers to establish good communication among operators  Meet with contractors in a professional manner to discuss challenges  Contact line workers in a friendly and enthusiastic manner to communicate safety and job specific needs		
Adaptability	3.68 Express receptivity to shared input from co-workers  Be flexible to ever-changing customer needs and requirements		

		Quickly accommodate to changing environments and conditions in order to maintain quality and
	L. L.	production
		Demonstrate sensitivity to customer's changing delivery schedule
Working in Teams	3.93	Meet with outside vendor to ensure that product specs and delivery times are completely understood
		Pass along information to co-workers concerning production demands issues and possible solutions
	•	Team with co-workers to communicate potential hazards to one another
Leading Others	3.60	Provide peer training on problem solving techniques
<b>3</b>		Motivate employees through positive affirmations rather than intimidation and fear
		Provide recognition for work well done
	l l	Become a spokesperson for department by evaluating areas of concern
		Provide timely feedback to an operator encountering performance problems
Dellation Company		Work with operators to collectively agree on process quality, product quality, and produce specs so
Building Consensus		that there are no differences
		Work with team to reach consensus on today's work assignments based on skills training and team member preference
		Facilitate agreement about quality, schedules and production to best format team assignments
		Resolve any performance issues in a positive manner to accomplish long-term production goals
		Create agreement by having all parties communicate regarding quality requirements and issues
Self and Career Development	2.72	Identify training courses offered by the company in order to meet with the business's requirements
Sell and Career Development		Self educate on customer and corporate goals and policies
		Share knowledge and ask for feedback from customers
		Attend training about communicating material specifications and delivery schedules
	4	Attend training about communicating material specifications and delivery schedules
Speaking	4.00	Communicate to the set up person the adjustments needed to bring a process into control
		Communicate to other employees quality requirements and production requirements
		Present training sessions to employees on new production processes
		Give oral production reports to co-workers of other shifts or departments to maintain goals
		Listen to the concerns of co-workers regarding product specifications and requirements for
Listening		improvements
		Listen to concerns of staff to better provide training
		Listen to the perspective of all team members in order to see the overall view of the issue
		Receive feedback from co-workers on job performance in an appropriate way

Writing	3.39	Complete a material requisition form when parts are needed
		Write change orders and document changes
		Document into quality system the defects in parts produced
		Write reports and memos to staff regarding changes in requirements
		Prepare a written schedule of work production for shipping
		Correspond during shift change to relate problems, tasks, etc. of ongoing production
Reading	3.89	Read communications written by fellow workers on corrective action to process
		Review customer product specifications and requirements and relate them back to peers
		Read RFIs and their related materials and paraphrase into specific orders/requests of co-workers and
		clients
		Read material specifications and delivery schedules
Math	2.93	Calculate scrap and rework data for reports
		Perform measurements to verify parts meet customer requirements
		Compare invoice to delivery
		Calculate downtime caused by part shortage
		Calculate weights of materials and delivery issues
Science	2.48	Knowledge of proper disposal of chemicals
		Understand actual needs of product in relation to the environment it will be used

#### **P6**

### Critical Work Function: Coordinate work team to produce product.

#### Critical work functions

describe the major responsibilities involved in carrying out a concentration

#### **Key Activities**

#### **Key activities** are the duties and tasks involved in carrying out a critical work function

#### **Performance Indicators**

Performance indicators correlate to the key activities. The performance indicators provide information on how to determine when someone is performing each key activity competently

#### Provide training to other employees.

Cross training is provided as appropriate. Training needs are assessed regularly.

New requirements and training issues are identified. Training approaches effectively achieve training goals. Training outcomes are documented.

#### Set team goals.

Team goals are specific, measurable, and achievable. Team goals are aligned to customer and business needs. Team goals focus the team in order to meet team objectives. Team goals are documented and communicated to all parties.

#### Make job assignments.

Job assignments match skills with the work to be done. Job assignments maximize the use of available skills. Job assignments ensure business and customer needs are met. Workers are notified of assignments effectively.

#### Coordinate work flow with team members and other work groups.

Production schedules are met effectively.

Team members are notified of schedule requirements in a timely way. Production workflow runs efficiently.

Downtime is minimized.

Relationships with others facilitate effective workflow.

Workers actively participate in meetings and problem-solving groups.

#### Concentrations

are the major areas of frontline work covering families of related jobs. Separate standards were identified for each concentration.

Describes what a worker needs to know or be able to do to perform the critical work function

### ACADEMIC AND EMPLOYABILITY SKILLS

Skill	overall destrate	ot out on being	Complexity Dimension	Complexity Subdimension	Carago de Maria	
Math	NA	L	Complexity of mathematics content	Number sense and computation Geometry, measurement, and spatial sense Complexity of data analysis, statistics, and probability Functions and algebraic thinking Complexity of representation and communication	NA NA NA NA	
			Complexity of problem solving	Mathematical methods Mathematical reasoning Mathematical tools	NA NA NA	
Science NA	NA	L	Complexity of scientific inquiry	Design Use of evidence	NA NA	
			Complexity of understanding the nature of science	Unifying concepts and processes	NA	
			Complexity of core scientific content	Physical science Life science Earth and space science	NA NA NA	
			Complexity of applied science	Science and technology Science in personal and social perspective	NA NA	
Reading	L	L	Complexity of text Complexity of reading skills Complexity of reading purpose		L L M	
Writing	L	L	L Complexity of text		Complexity of text	L
			Complexity of writing product	Type of product Organization Elaboration	L M M	
			Complexity of writing process	Writing development To inform To persuade	L M M	
Listening M	М	М	Complexity of communication	Content complexity Demands on attention Communication indirectness	M M M	
			Barriers to communication	Limitations on interaction Distractions	M M	
Speaking M	М	М	Complexity of communication	Content complexity Tact and sensitivity required Communication indirectness	M M M	
			Context demands	Diversity of audience Constraints on preparation Distractions Listener resistance	M M M	
Using Information and Com-	L	L	Complexity of technology application	Complexity of equipment or technology Complexity of applications Training time constraints	L L M	
munications Technology			Frequency of technology change	New learning required	М	
Gathering and Analyzing	М	М	Difficulty of information gathering	Amount of information Number and variety of sources Resourcefulness needed	M M M	
Information			Complexity of analysis	Complexity of information and analysis  Need to evaluate source information  Lack of analysis guidelines	M M M	

#### ACADEMIC AND EMPLOYABILITY SKILLS

Skill	Overall desira	odes overall desira	ct.isa <sup>ts</sup> Complexity Dimension	Complexity Subdimension	Cerdistricus de la Cerdistricus
Analyzing and Solving		М	Problem complexity	Problem uniqueness or difficulty Number and range of problems	M M
Problems			Solution complexity	Number and complexity of possible solutions	M
Making Decisions and	М	M	Degree of judgment or inference required	Lack of guidance or precedents Integration difficulty Quantity or ambiguity of risks and consequences	M M M
Judgments			Individual decision-making responsibility	Accountability and autonomy Absence or ambiguity of rules or policy constraints	M M
Organizing and Planning	М	Н	Complexity of plans	Goal complexity or ambiguity Flexibility required Resource coordination required Scope and effects of planning	M M M
			Constraints on planning	Lack of guidelines Lack of feedback Constraints on resource availability	M M M
Using Social Skills	М	н	Complexity of social interactions	Diversity Structure or protocol required Tact and sensitivity required	M M M
Adaptability	М	М	Degree of adaptability required  Difficulty of adapting	Frequency of change Unpredictability of change Lack of support for change	M M
Working in Teams	н	Н	Degree of collaboration required  Team member heterogeneity  Goal or role ambiguity	Task interdependence  Team diversity  Lack of clarity or support for team goals	H M M
Leading Others	М	Н	Work challenges	Lack of clarity or stability of responsibilities  Challenges to goal attainment  Work structuring requirements  Scope and complexity of leadership responsibility	M M M
			People challenges	Coaching or monitoring needs Conflict management needs	M M
Building Consensus	М	М	Consensus process inhibitors	Number and diversity of stakeholders Ambiguity of goals Lack of organizational support, incentives, or consensus leadership High consensus standard	M M M
			Difficulty of issues requiring consensus	Complexity of issues Contentiousness of issues Lack of opportunities for agreement	M M M
Self and Career	М	М	Need for learning and development	Self and career development requirements	M
Develop- ment			Limitations on learning and development opportunities	Time, resource, or support constraints Application constraints	M M

Overall complexity ratings: The *overall* level of complexity required in a skill in order to perform the critical work function. *Scale*: H=high complexity; M=moderate complexity; and L=low complexity. Two separate ratings are provided: one for *workers* (entry-level up to first-line supervisors) and the other for *supervisors* (first-line supervisors). In some cases, the overall complexity rating was NA (Non-Applicable). This means that this skill was deemed not to be needed to perform this given critical work function, so no complexity rating was assigned.

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Describes what a worker needs to know or be able to do to perform the critical work function

#### OCCUPATIONAL AND TECHNICAL KNOWLEDGE AND SKILLS

These are the technical knowledge and skills needed to perform the critical work function.

Skill Category	Specific Knowledge and Skills	Specific Knowledge and Skills
Work Flow Planning	A. Skill in making job assignments and coordinating workflow.     B. Knowledge of production process, including flow and bottlenecks.     C. Knowledge of production schedules.	D. Knowledge of lead-time required for a production plan.     E. Knowledge of worker skill levels and work rules to position employees to maximizes productivity.     F. Knowledge of overall production requirements.
Fraining	A. Skill in training employees effectively, including on the job training.     B. Knowledge of educational opportunities for individual advancement.     C. Skill in matching training needs to business requirements.     D. Skill in providing feedback to improve worker performance.     E. Skill in providing cross-training.	F. Knowledge of job-specific certification and licensing requirements. G. Knowledge of job descriptions for work team members. H. Knowledge of techniques used by company to assess worker skills. I. Skill in keeping training records. J. Knowledge of company sponsored training opportunities.
Business Policies and Procedures	A. Knowledge of who to notify (i.e., set up team, lead person, maintenance) if a machine breaks down.     B. Knowledge of how to write up job assignments for workforce.     C. Knowledge of company promotion and advancement policies and guidelines.	D. Knowledge of company performance evaluation policy and guidelines.     E. Knowledge of existing contracts and agreements that impact worker assignments.     F. Knowledge of rules of conduct as they apply in the workplace.

Cı	itical Work Functio	n: Coordinate work team to produce product
Knowledge/skill		Examples
Using Information and Communication	3.17	Use email to coordinate work flow with other team members
Technology		Track daily output on spreadsheet
		Track training on database
Gathering and Analyzing Information	3 58	Evaluate workers' abilities to determine work assignments
Cutiering and Analyzing information	0.00	Gather data on employee abilities for development and training
		Use information from previous production runs to coordinate work flow and then schedule workers
		Analyze production schedule to assign work-related duties
Analyzing and Solving Problems	3.53	Properly match job tasks to employee with skills pertinent to the task
		Identify and discuss team activities to anticipate production delays
		Assess team member skills for training needs and career development
Making Danisiana and Judamanta	0.00	Deside interestingues at the continuing fit between all littles at a section and a
Making Decisions and Judgments	3.39	Decide job assignments to maximize fit between skill levels and production needs
		Determine team key indicators and base performance goals upon them
		Prioritize work assignments to match team goals  Determine if training session is necessary prior to starting next project
		Decide which jobs will require a special team effort
		Decide which jobs will require a special team enort
Organizing and Planning	3.63	Organize cross-training of associates within a cell to develop and improve skills
		Organize a training matrix to ensure cross training is thorough and documented
		Organize production process to best suit the team assigned
		Plan with other crafts how to best schedule work in order to maintain progress
	0.00	
Using Social Skills	3.83	Meet with team in a cooperative manner to establish goals and timeframes
		Meet with operators in a helpful way to discuss corrective action required due to their error, in order to prevent it from occurring again
		Demonstrate respect during team meetings
		Give positive feedback to employees on job performance
		ene positive reconstant to employees on job performance
Adaptability	3.55	Be willing to listen to the suggestions of others regarding ideas that may improve team interaction
. ,		Demonstrate to peers the need to set common team goals
		Adjust work process based on skill level of work team
		Cross train employees so they can fill in at other jobs as needed
Working in Teams	4.13	Work with all team members to set goals, assign jobs and establish work schedules
		Team with engineering to fine tune a new process
		Meet daily with team members to identify job assignments and daily team goals

	Work collaboratively with work team in order to cross train	
	Work conaboratively with work toarn in order to cross train	
Leading Others	3.69 Lead daily production meetings	
	Influence others in the group to pursue higher skill levels	
	Set realistic goals and follow through with positive rewards when met	
	Mentor new employees	
	Focus on problems - not individuals - during team meetings	
	Build consensus by establishing work team goals targeted at productivity, quality and schedule	
Building Consensus	3.50 attainment	
	Provide career development and training based on team recommendations	
	Establish realistic goals with input from all to accomplish predictable timelines	
	Facilitate agreement on job assignments in order to meet requirements and schedules	
Self and Career Development	3.13 Learn how to train others (OJT) so that known skills are effectively communicated to others	
	Become an active team member to promote others in pursuing self-improvement courses and	
	seminars	
	Learn new communication skills to improve team communications	
	Identify individual career goals available within the framework of the team goals	
Speaking	3.75 Inform the team of the goals of the area for the month to ensure there is understanding within the	team
	Communicate the knowledge you have gained about a specific process or machine tool	
	Provide feedback on downtime to supervisor to optimize time utilization	
	Discuss specific assignments with team and relay all specific information	
	Discuss specific assignments with team and relay all specific information  Determine production goals and verbally communicate these to team members	
	Discuss specific assignments with team and relay all specific information	
Listening	Discuss specific assignments with team and relay all specific information  Determine production goals and verbally communicate these to team members  Talk with workers about career development to improve talents and motivate	
Listening	Discuss specific assignments with team and relay all specific information  Determine production goals and verbally communicate these to team members	
Listening	Discuss specific assignments with team and relay all specific information  Determine production goals and verbally communicate these to team members  Talk with workers about career development to improve talents and motivate  3.42 Listen to entire question before answering a student's question	ns
Listening	Discuss specific assignments with team and relay all specific information  Determine production goals and verbally communicate these to team members  Talk with workers about career development to improve talents and motivate	
Listening	Discuss specific assignments with team and relay all specific information  Determine production goals and verbally communicate these to team members  Talk with workers about career development to improve talents and motivate  3.42 Listen to entire question before answering a student's question  Listen to the feedback of work team members concerning down time causes and possible solution	
Listening	Discuss specific assignments with team and relay all specific information  Determine production goals and verbally communicate these to team members  Talk with workers about career development to improve talents and motivate  3.42 Listen to entire question before answering a student's question  Listen to the feedback of work team members concerning down time causes and possible solution  Listen to concerns of employees on ability to meet or exceed certain goals and summarize them for proper evaluation  Listen to needs of co-workers who wish to add to their skill base	
Listening	Discuss specific assignments with team and relay all specific information  Determine production goals and verbally communicate these to team members  Talk with workers about career development to improve talents and motivate  3.42 Listen to entire question before answering a student's question  Listen to the feedback of work team members concerning down time causes and possible solution  Listen to concerns of employees on ability to meet or exceed certain goals and summarize them for proper evaluation	
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Listening	Discuss specific assignments with team and relay all specific information  Determine production goals and verbally communicate these to team members  Talk with workers about career development to improve talents and motivate  3.42 Listen to entire question before answering a student's question  Listen to the feedback of work team members concerning down time causes and possible solution  Listen to concerns of employees on ability to meet or exceed certain goals and summarize them for proper evaluation  Listen to needs of co-workers who wish to add to their skill base  Listen to concerns of another work group while coordinating work flow  3.41 Record meeting/team notes and publish polished copy for review and update	
	Discuss specific assignments with team and relay all specific information  Determine production goals and verbally communicate these to team members  Talk with workers about career development to improve talents and motivate  3.42 Listen to entire question before answering a student's question  Listen to the feedback of work team members concerning down time causes and possible solution  Listen to concerns of employees on ability to meet or exceed certain goals and summarize them for proper evaluation  Listen to needs of co-workers who wish to add to their skill base  Listen to concerns of another work group while coordinating work flow	

	Write team goals in su	ccinct manner to motivate employees
	Write team memos fo	education or informative purposes
Reading	3.26 Read and understand	training books and manuals to disseminate information to team
	Read employee perfo	mance evaluation in order to improve one's work performance
	Read and review orde	rs and team updates in order to participate in product development
	Read memos from oth	er work groups to understand process implications
	Read team meeting n	otes
Math	2.92 Calculate schedule go	als
	Calculate team produc	tivity levels
	Analyze production da	ta to determine manpower requirements needed to achieve goals
Science	2.07 Apply principles of bio	logy in order to explain hazardous materials and the effect on the human body

Concentrations

line work cover-

ing families of

Separate standards were iden-

tified for each

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are the major areas of front-

### Critical Work Function: Ensure safe use of equipment in the workplace. Critical work functions

describe the major responsibilities involved in carrying out a concentration

#### **Key Activities**

#### **Key activities** are the duties and tasks involved in carrying out a critical work function

#### Performance Indicators

**Performance indicators** correlate to the key activities. The performance indicators provide information on how to determine when someone is performing each key activity competently

#### Train others to use equipment safely

New operators are given a complete orientation to the equipment.

All important information regarding equipment safety is communicated clearly and effectively.

Maintenance workers obtain certification to train others in technical skills and knowledge, where applicable.

Suggestions regarding training materials and content are made to correct parties.

Evaluations and feedback are utilized to improve training materials and methods.

During training, trainee has the correct tools to do the job.

Post- training evaluation indicates that workers can operate equipment safely.

Training and facilitation techniques used are appropriate for the audience.

Quality and effectiveness of training are documented appropriately.

#### Suggest process and procedures that support safety and effectiveness of work environment

Health and safety representatives are consulted in the development of suggestions.

Operator feedback is solicited and used in suggestions on how to create a safer, more effective work environment.

Suggestions are made to correct parties, according to company procedure.

Suggestions are properly documented.

Content of suggestions appropriately responds to safety, quality and productivity issues.

#### Fulfill safety and health requirements for maintenance. installation and repair

Communication regarding safety is made regularly to all employees.

Job safety analyses are reviewed regularly according to company policy.

Hazardous materials procedures and policies, such as Material Safety Data Sheet and "right to know" are accurately followed.

Environmental testing of workplace is performed on a regular basis as required by company policy or

Equipment is audited to ensure there are no by-passes of safety guards.

All regulatory and company safety procedures are followed including lock-out & tag-out, confined space and

Good housekeeping procedures are followed.

Safety and personal protective equipment is available, performs correctly, and has current certification.

#### Monitor equipment and operator performance

Monitoring is performed regularly.

Out-of-compliance or unsafe conditions are reported immediately.

Corrective action is taken on out-of-compliance or unsafe conditions.

Equipment is checked to ensure it is operating according to specifications.

Tools are checked to ensure they are in compliance with specifications.

Accident and injury data is forwarded to appropriate personnel for inclusion in OSHA recordables.

Information on the equipment use is gathered from operators to reveal existing or potential problems.

Equipment and process are adjusted correctly.

All monitoring data is accurately documented.

**About the Work** 

Describes what a worker needs to know or be able to do to perform the critical work function

### ACADEMIC AND EMPLOYABILITY SKILLS

Skill	Ore compaine	ore of the street	Complexity Dimension	Complexity Subdimension	Ortist de inch
Math	L	L	Complexity of mathematics content	Number sense and computation Geometry, measurement, and spatial sense Complexity of data analysis, statistics, and probability Functions and algebraic thinking Complexity of representation and communication	L L NA NA L
			Complexity of problem solving	Mathematical methods Mathematical reasoning Mathematical tools	NA L L
Science	L	L	Complexity of scientific inquiry	Design Use of evidence	L L
			Complexity of understanding the nature of science	Unifying concepts and processes	L
			Complexity of core scientific content	Physical science Life science Earth and space science	L NA NA
			Complexity of applied science	Science and technology Science in personal and social perspective	L L
Reading	М	М	Complexity of text Complexity of reading skills Complexity of reading purpose		M M M
Vriting	М	М	Complexity of text	Complexity of text	М
			Complexity of writing product	Type of product Organization Elaboration	M M M
			Complexity of writing process	Writing development To inform To persuade	L M M
Listening M	М	М	Complexity of communication	Content complexity Demands on attention Communication indirectness	M M
			Barriers to communication	Limitations on interaction Distractions	M M M
Speaking M	М	М	Complexity of communication	Content complexity Tact and sensitivity required Communication indirectness	M M L
			Context demands	Diversity of audience Constraints on preparation Distractions Listener resistance	M M M
Jsing nformation and Com-	L	L	Complexity of technology application	Complexity of equipment or technology Complexity of applications Training time constraints	M L L
nunications Fechnology			Frequency of technology change	New learning required	М
Gathering and Analyzing	М	М	Difficulty of information gathering	Amount of information Number and variety of sources Resourcefulness needed	M M M
Information			Complexity of analysis	Complexity of information and analysis  Need to evaluate source information  Lack of analysis guidelines	M L L

#### ACADEMIC AND EMPLOYABILITY SKILLS

Skill	Overoll destry	ode's Overoll destrict	St.ico <sup>ts</sup> Complexity Dimension	Complexity Subdimension	Collistic Land
Analyzing and Solving	М	M	Problem complexity	Problem uniqueness or difficulty Number and range of problems	M M
Problems			Solution complexity	Number and complexity of possible solutions	M
Making Decisions and	М	M	Degree of judgment or inference required	Lack of guidance or precedents Integration difficulty Quantity or ambiguity of risks and consequences	L M M
Judgments			Individual decision-making responsibility	Accountability and autonomy Absence or ambiguity of rules or policy constraints	M L
Organizing and Planning	М	М	Complexity of plans	Goal complexity or ambiguity Flexibility required Resource coordination required Scope and effects of planning	L M M M
			Constraints on planning	Lack of guidelines Lack of feedback Constraints on resource availability	L L M
Using Social Skills	М	М	Complexity of social interactions	Diversity Structure or protocol required Tact and sensitivity required	M M M
Adaptability	М	L	Degree of adaptability required  Difficulty of adapting	Frequency of change Unpredictability of change Lack of support for change	M M M
Working in Teams	М	M	Degree of collaboration required	Task interdependence	M
			Team member heterogeneity	Team diversity	M
			Goal or role ambiguity	Lack of clarity or support for team goals Lack of clarity or stability of responsibilities	L L
Leading Others	M M		Work challenges	Challenges to goal attainment Work structuring requirements Scope and complexity of leadership responsibility	M M M
			People challenges	Coaching or monitoring needs Conflict management needs	M M
Building Consensus	М	М	Consensus process inhibitors	Number and diversity of stakeholders Ambiguity of goals Lack of organizational support, incentives, or consensus leadership High consensus standard	M L M
			Difficulty of issues requiring consensus	Complexity of issues Contentiousness of issues Lack of opportunities for agreement	M M M
Self and Career	М	L	Need for learning and development	Self and career development requirements	М
Develop- ment			Limitations on learning and development opportunities	Time, resource, or support constraints Application constraints	L M

Overall complexity ratings: The overall level of complexity required in a skill in order to perform the critical work function. Scale: H=high complexity; M=moderate complexity; and L=low complexity. Two separate ratings are provided: one for workers (entry-level up to first-line supervisors) and the other for supervisors (first-line supervisors). In some cases, the overall complexity rating was NA (Non-Applicable). This means that this skill was deemed not to be needed to perform this given critical work function, so no complexity rating was assigned.

Complexity Subdimension ratings: These are complexity level ratings for individual aspects of the particular skill. Scale: H=high complexity; M=moderate complexity; and L=low complexity. At this time, these ratings are provided for workers only. In some cases, the subdimension complexity rating was NA (Non-Applicable). This means that this particular dimension of the skill was deemed not to be needed to perform this given critical work function, so no complexity rating was assigned.

Describes what a worker needs to know or be able to do to perform the critical work function

#### OCCUPATIONAL AND TECHNICAL KNOWLEDGE AND SKILLS

These are the technical knowledge and skills needed to perform the critical work function.

Skill Category	Specific Knowledge and Skills	Specific Knowledge and Skills
Regulatory Compli- ance	A. Knowledge of government policies, procedures, and regulations governing the safe use of equipment.     B. Knowledge of procedures to prevent or reduce emissions and spills.     C. Knowledge of Hazardous Materials (HAZMAT) procedures information.     D. Knowledge of Material Safety Data Sheets (MSDS).     E. Knowledge of applicable safety standards	F. Knowledge of which tools and equipment require safety certification.     G. Knowledge of what the law requires companies to post or publish in order to keep employees abreast of OSHA and other government regulations.     H. Knowledge of EPA required documentation for (a) disposal of hazardous waste generated during maintenance or (b) transportation of contaminated items.
Mainte- nance Procedures	A. Knowledge of equipment operation and design parameters to determine if machine is operating safely.     B. Skill in reviewing environmental data systems in the factory.	C. Skill in making adjustments to equipment to ensure that is operating within established parameters.  D. Skill in regularly monitoring equipment for unsafe conditions.
Training	A. Knowledge in identifying safety training courses  B. Knowledge of equipment manual and standard practice manual to repair equipment safely.  C. Knowledge of certifications needed for regulatory compliance (i.e., Cardio Pulmonary Resuscitation (CPR), Fire extinguisher, and Blood born Pathogens).  D. Skill in conducting equipment safety demonstrations.	E. Skill in training other workers in proper safety procedures during maintenance process.  F. Knowledge of the tools and materials needed to operate equipment to train others.  G. Skill in using monthly safety meetings to improve the safety environment and communicate changes in regulations.
Safety Procedures	A. Skill in developing safety checklists.     B. Knowledge of equipment safety systems to verify that they are operating properly.     C. Knowledge to how prevent unsafe shutdown of equipment.     D. Knowledge of personal protective equipment that should be worn.     E. Skill in performing leak checks to determine if toxic or hazardous material is escaping from a piece of equipment.     F. Skill in evaluating workplace safety using safety audit processes.     G. Knowledge of hazard to document and communicate corrective actions and monitor performance.	H. Knowledge of company safety policies (e.g., Lock out/Tag out).  I. Knowledge of proper and safe installation techniques as described in manuals, checklists, and regulations.  J. Skill in recognizing and proposing ways to improve safety practices to propose alternative practices.  K. Knowledge of Material Safety Data Sheets  L. Knowledge of Hazardous Materials (HAZMAT) policies and procedures.  M.Skill at modifying machines as prescribed to prevent injuries and improve ergonomics.  N.Skill in generating and sharing near miss reports.

Cri	tical Work Function	Ensure safe use of equipment in the workplace
Knowledge/skill	Mean Importance	Examples
		Prepare and deliver PowerPoint presentations
Using Information and Communication		Email concerned individuals about safety needs or conditions
Technology		Use computer to document and monitor performance training
		Use technology to research safety practices and guidelines
		Use computer and other telecomm equipment to communicate safety information
		Use document database to view documents for tool operation and qualification
		Determine the topics of training (by reading maintenance manuals, participating in vendor training, and
Gathering and Analyzing Information	4.15	reviewing OSHA standards) to assess training needs
		Orient new operators in the proper use of equipment and suggest process improvements
		Review safety requirements for a piece of equipment and integrate the requirements into the
		production procedures
		Organize information to meet safety requirements; put safety information at a central location for all
		maintenance persons involved
		Gather and track safety metrics so that the workforce can be educated on how better they may utilize
		equipment safety
Analyzing and Solving Problems	3.60	Anticipate, identify and provide responsive preventive training for safe use of equipment
Analyzing and colving residing	0.02	Identify safety problems of aging equipment and replace or bring up to date
		Evaluate operator suggestion and ideas for safe improvements
		Analyze processes to ensure safety standards have been met
Making Decisions and Judgments	4.08	Determine if equipment is being operated within appropriate safety standards
		Make a judgment about improving processes to reduce or eliminate safety injuries
		Determine best safety practices, policies and procedures for equipment
		Judge effectiveness/content of safety; Determine adequacy of safety plan for maintenance
		Check to see if job is safe; if it is not safe, make necessary changes and document why changes were made
		Inlaue
Organizing and Planning	3.65	Plan safety-related training for equipment based on operator, maintenance, installer experience
		Organize time to ensure that safety operations are performed when needed
		Plan down time so as to minimize it
		Plan the safety items and tasks needed in preventive maintenance or maintenance
		Develop plan to train all people who use equipment on safety procedures and practices
Using Social Skills	3.8	Interact with the user in positive manner to assure that proper safety methods are followed
	9.0	Make suggestions or provide training in a courteous way
		Communicate with operators regarding proper operations; also solicit feedback regarding machine
		operation
		Train others to use equipment safely; Suggest improvements and interact with operators
		Use social skills to sell the positives of good safety practices

A 1 1 1114	
Adaptability	3.46 Shut down out of compliant equipment to assure unsafe practices or out of compliance does not occ
	Change the training method to ensure safe equipment operation
	Demonstrate openness to new safety procedures
	Understand differences in learning styles and modify methods accordingly
	Be adaptable to msd's and OSHA standard changes
Working in Teams	3.92 Team operators with safety personnel to eliminate or reduce the impact of workplace hazards
	Have teams write procedures on safe use of equipment in the workplace
	Work with team to identify root cause and implement corrective measures
	Gather information from team members and identify corrective/ preventive action
	Share knowledge and experience with team members to increase the knowledge of entire team
Leading Others	4.00 Practice safety in all areas, leading others by example
	Perform on the spot corrections of unsafe practices and procedures
	Influence others by following safety procedures, making suggestions for improvements and doing a
	good job
	Influence employees to attend equipment safety training
	Give proper training and coaching on how to safely use equipment
Building Consensus	3.69 Facilitate safety training classes by combining operations and maintenance personnel
Daniang Conconcac	Provide examples of acceptable work practices and discuss the features and benefits of each
	Build consensus among all maintenance employees to ensure proper safety guidelines are followed
	Pass on info about unsafe conditions, equipment or operations to appropriate organizations (internal
	for resolution
Oak and Oansen Development	
Self and Career Development	3.88 Identify opportunities in safety such as safety rep positions
	Attend OSHA and operator-related training
	Constantly monitor changes in safety practices
	Know what is required for safety compliance and what is really needed to keep employees safe, to reduce cost and injury
	Attend safety and OSHA training on equipment; Improve safe working conditions
	Attend safety and CoriA training on equipment, improve safe working conditions
Speaking	4.13 Talk to new employees about dangers of work place
	Give presentation on proper use and safety of tools and equipment to co-workers
	Explain to new operators the location and function of safety devices on the equipment they are using
	Train others to use equipment safely; Report issues and problems effectively

Listening	4.29 Listen to feedback from machine operators once a safety procedure is introduced
	Listen to verbal communication of safety and OSHA regulations from supervisors (e.g., accidents, loss
	time, workers comp)
	Listen to and evaluate operator feedback for use in better safety procedures
	Create detailed near miss reports to educate co-workers about unsafe situations and corrective
Writing	3.88 measures
	Create detailed safety operating procedures for equipment maintenance
	Document how a piece of equipment complies with regulations
	Write safety rules, safe procedures and practices, etc.
	Develop a written lock-out tag-out program so everyone knows what is going to take place
Reading	4.56 Read and understand equipment maintenance safety procedures before operating equipment
	Read equipment operation and service documents
	Review the material safety data sheets for a new piece of equipment
	Read documentation on personal protective equipment needed when working on a tool
	Read training materials, safety rules, equipment operating procedures
Math	3.60 Compute calculations to determine environmental impact
	Compare and contrast man hours of safe to unsafe practices (ROI, CBA)
	Apply statistical analysis to preventative maintenance operations
	Estimate performance of equipment after repairs are completed
	Perform necessary calculations to ensure tools comply with specs
Science	3.85 Explain HAZMAT requirements for equipment maintenance procedures (MSDS, PPE, OSHA)
	Apply knowledge of physics, chemistry to safety activities in the workplace
	Apply principles of physics to identify reduction in ergonomic injuries
	Identify which chemicals are in the facility by material safety data sheets
	Apply environmental/safety and hazards standards in equipment operations

**Concentrations** 

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ing families of

Separate stan-

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dards were identified for each

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### Critical Work Function: Correct the product and process to meet quality standards

describe the major responsibilities involved in carrying out a

concentration

Critical work functions

**P8** 

#### **Key Activities**

#### **Key activities** are the duties and tasks involved in carrying out a critical work function

#### **Performance Indicators**

**Performance indicators** correlate to the key activities. The performance indicators provide information on how to determine when someone is performing each key activity competently

#### Communicate quality problems

Quality problems are reviewed with production operators. Quality problems are communicated promptly to appropriate parties. Quality problems are documented according to established processes. Defect trends are summarized and reported to appropriate parties.

#### Suggest or perform corrective actions to correct quality problems

Minor quality issues or adjustments are made immediately. Quality issues or adjustments are documented properly.

Recommendations for action are clear, concise, and supported by data. Recommendations are made to the appropriate parties in a timely way. Follow-up activities indicate that corrective action was taken.

Product quality is documented following corrective action. Quality procedures regarding sub-standard products are executed promptly within the defined quality

#### Determine appropriate action for sub-standard product

Decisions regarding sub-standards products are documented for future retrieval.

Sub-standard product is appropriately processed.

Documentation required for customers is distributed to appropriate parties.

#### Record process outcomes and trends

Records on quality process are maintained to appropriate standards.

Outcomes of quality processes are charted according to appropriate methods and standards.

Data on quality process performance is accurate.

Quality process performance data is analyzed to identify trends.

Quality process performance data is reported to appropriate parties in a timely manner.

#### Identify and report performance and training issues affecting quality

Performance and training issues related to quality are identified in a timely manner.

Corrective action is taken for quality issues impacting the health or safety of workers.

#### Implement closedloop corrective action

Evidence of corrected action is documented in a timely manner.

Change resulting from the corrective action is communicated to appropriate parties in the correct format. Implementation of the corrective action is verified through spot checks.

Reports are stored properly for the specified timeframes.

Ongoing audits are performed to optimize the outcomes of the corrective steps.

Previous documentation on similar process issues is examined to identify possible solutions.

Describes what a worker needs to know or be able to do to perform the critical work function

### ACADEMIC AND EMPLOYABILITY SKILLS

Skill	Oreight deritation	ster overall design	Complexity Dimension	Complexity Subdimension	Ordistration of M
Math	М	М	Complexity of mathematics content	Number sense and computation Geometry, measurement, and spatial sense Complexity of data analysis, statistics, and probability Functions and algebraic thinking Complexity of representation and communication	M M M M
			Complexity of problem solving	Mathematical methods Mathematical reasoning Mathematical tools	M M M
Science	NA	М	Complexity of scientific inquiry	Design Use of evidence	NA NA
			Complexity of understanding the nature of science	Unifying concepts and processes	NA
			Complexity of core scientific content	Physical science Life science Earth and space science	NA NA NA
			Complexity of applied science	Science and technology Science in personal and social perspective	NA NA
Reading	М	М	Complexity of text		М
			Complexity of reading skills Complexity of reading purpose		M M
Writing	М	М	Complexity of text	Complexity of text	M
			Complexity of writing product	Type of product	М
			or production of	Organization Elaboration	M M
			Complexity of writing process	Writing development To inform To persuade	M M M
	1.4			·	
Listening	М	М	Complexity of communication	Content complexity Demands on attention	M M
				Communication indirectness	М
			Barriers to communication	Limitations on interaction Distractions	M M
Speaking	м	М	Complexity of communication	Content complexity	м
Speaking	***		complexity of communication	Tact and sensitivity required	M
				Communication indirectness	L
			Context demands	Diversity of audience	M
				Constraints on preparation Distractions	M M
				Listener resistance	M
Using	М	М	Complexity of technology application	Complexity of equipment or technology	М
Information and Com-				Complexity of applications Training time constraints	M
munications Technology			Frequency of technology change	New learning required	M
Gathering	М	М	Difficulty of information gathering	Amount of information	М
and Analyzing	141	VI	zimeacy or information gathering	Number and variety of sources Resourcefulness needed	M M M
Information			Complexity of analysis	Complexity of information and analysis  Need to evaluate source information  Lack of analysis guidelines	M M M

#### ACADEMIC AND EMPLOYABILITY SKILLS

Skill	Overall period	oder Oder of the start	Complexity Dimension	Complexity Subdimension	Caraga de Montes
Analyzing and Solving	н	Н	Problem complexity	Problem uniqueness or difficulty Number and range of problems	M H
Problems			Solution complexity	Number and complexity of possible solutions	M
Making Decisions	М	М	Degree of judgment or inference required	Lack of guidance or precedents Integration difficulty	M M
and Judgments				Quantity or ambiguity of risks and consequences	M
<b>,6</b>			Individual decision-making responsibility	Accountability and autonomy Absence or ambiguity of rules or policy constraints	<u>м</u> м
Organizing	М	М	Complexity of plans	Goal complexity or ambiguity	M
and Planning				Flexibility required	<u>M</u>
				Resource coordination required	<u>M</u>
				Scope and effects of planning	M
			Constraints on planning	Lack of guidelines	М
				Lack of feedback	M
				Constraints on resource availability	М
Using Social	М	м	Complexity of social interactions	Diversity	М
Skills			complexity of social interactions	Structure or protocol required	M
				Tact and sensitivity required	М
Adaptability	М	М	Degree of adaptability required	Frequency of change	М
			Difficulty of adapting	Unpredictability of change	М
				Lack of support for change	М
Working in Teams	М	М	Degree of collaboration required	Task interdependence	М
			Team member heterogeneity	Team diversity	М
			Goal or role ambiguity	Lack of clarity or support for team goals	L
				Lack of clarity or stability of responsibilities	M
Leading	М	М	Work challenges	Challenges to goal attainment	М
Others			Ü	Work structuring requirements	M
				Scope and complexity of leadership responsibility	NA
			People challenges	Coaching or monitoring needs	NA
			,	Conflict management needs	M
Building	М	м	Consensus process inhibitors	Number and diversity of stakeholders	м
Consensus	141	141	Consensus process minorors	Ambiguity of goals	M
Conscilua				Lack of organizational support, incentives, or	141
				consensus leadership	M
				High consensus standard	М
			Difficulty of issues requiring consensus	Complexity of issues	М
			Sincercy of issues requiring consensus	Contentiousness of issues	M M
				Lack of opportunities for agreement	M
Self and Career	М	М	Need for learning and development	Self and career development requirements	М
Develop-			Limitations on learning and development	Time, resource, or support constraints	М
ment			opportunities	Application constraints	М
			I The state of the		

Overall complexity ratings: The *overall* level of complexity required in a skill in order to perform the critical work function. *Scale*: H=high complexity; M=moderate complexity; and L=low complexity. Two separate ratings are provided: one for *workers* (entry-level up to first-line supervisors) and the other for *supervisors* (first-line supervisors). In some cases, the overall complexity rating was NA (Non-Applicable). This means that this skill was deemed not to be needed to perform this given critical work function, so no complexity rating was assigned.

Complexity Subdimension ratings: These are complexity level ratings for individual aspects of the particular skill. *Scale*: H=high complexity; M=moderate complexity; and L=low complexity. At this time, these ratings are provided for workers only. In some cases, the subdimension complexity rating was NA (Non-Applicable). This means that this *particular dimension* of the skill was deemed not to be needed to perform this given critical work function, so no complexity rating was assigned.

Describes what a worker needs to know or be able to do to perform the critical work function

### OCCUPATIONAL AND TECHNICAL KNOWLEDGE AND SKILLS

These are the technical knowledge and skills needed to perform the critical work function.

Skill Category	Specific Knowledge and Skills	Specific Knowledge and Skills	
Quality	A. Knowledge of quality standards and how they apply to products to make	F. Skills in evaluating defect patterns.	
Process	effective decisions about quality problems.  B. Knowledge of quality procedures and product specifications to identify	G. Knowledge of how to store reports to ensure that a comprehensive history of problems for specific parts or material exists.	
	nonconformance.	H. Knowledge of procedures for processing nonconforming product.	
	<ul> <li>C. Knowledge of corrective action methods for dealing with non-confor- mances to avoid future occurrences.</li> </ul>	Skill in recognizing and reporting unsafe conditions.      Skill in developing and documenting quality procedures, check lists and	
	D. Knowledge of rejection procedures so that substandard product is reject-	<ol> <li>Skill in developing and documenting quality procedures, check lists and methods.</li> </ol>	
	ed and properly processed.	K. Skill in identifying inaccuracies in quality data and responding to them.	
	E. Knowledge of what constitutes product defects.	L. Knowledge of quality terminology.	
Quality Tools and	A. Skill in using Total Quality Management (TQM) and other quality tools to identify problems and record quality issues.	F. Skill in developing performance indicators that can be readily understood by operators.	
Statistical	B. Knowledge of statistics for making accurate decisions about quality data.	G. Skill in using historical data to perform analysis.	
Systems	<ul> <li>C. Knowledge of how to accurately troubleshoot and categorize defect types to determine root cause.</li> </ul>	H. Skill in using design of experiments to determine problems and corrective action while ensuring repeatability and reproducibility.	
	D. Knowledge of how to create charts (e.g., variables and attributes) to record and analyze quality measurements from a production process to	Knowledge of Statistical Process Control (SPC) or specific quality system in place to effectively monitor sampling and statistical methods.	
	identify root causes and recommendations.  E. Skill in determining accuracy and precision when using measuring equip-	<ul> <li>J. Knowledge of calibration plan and procedures using current references an standards.</li> </ul>	
	ment.	K. Knowledge of how to use inspection and analysis tools, equipment and procedures.	
Quality Documen-	A. Skill in using computing systems to document and track substandard and scrapped parts, materials, and assemblies as required by quality processes.	F. Knowledge of procedures for recording product history and maintaining records.	
tation	B. Knowledge of documentation process and requirements to ensure verifiable evidence of product quality.	G. Skill in compiling data and ensuring that changed processes or procedures have met new requirements.	
	C. Knowledge of quality system protocol for performing an audit. D. Knowledge of the procedure for reviewing quality problems with opera-	<ul> <li>H. Knowledge of the appropriate process for storing records to comply with procedures and standards.</li> </ul>	
	tors to provide feedback.  E. Knowledge of correct approval procedures to document inspection results.	Knowledge of how to complete proper forms to document problems and corrective action.	
Corrective	A. Knowledge of health and safety standards to ensure quality problems are	F. Knowledge of preventive methods.	
Action	addressed correctly without impairing health and safety.  B. Knowledge of how to conduct follow-up activities to validate that cor-	G. Knowledge of customer requirements  H. Knowledge of when to stop process to prevent production of defective	
	rective action has been taken.	product.	
	C. Knowledge of how to access and use previous documentation to help	Skill in developing and applying preventive actions and mistake proofing.	
	develop solutions.	J. Skill in identifying trends that require a systemic solution.	
	D. Knowledge of company's corrective action procedure to follow up on	K. Skill in correctly tagging and segregating non-conforming material.	
	quality problems and corrections.  E. Skill in determining corrective action.	L. Skill in investigating non-conformances (e.g., rejection tags) to determine root cause and recommend corrective action.	
Continuous Improve- ment Process	A. Skill in facilitating a corrective action team to determine what will be required to improve the system and its process.	B. Skill in analyzing technical data and drawings and gaining group consensus to avoid future non-conformance.	
Business	A. Skill in identifying performance expectations to meet production goals.	C. Knowledge of company procedures.	
Policies and Procedures	B. Knowledge of the functions of different departments for recommending company-wide solutions.	D Skill in communicating clearly to large production groups about aspects of the quality system, including documentation, specification, or design changes.	
Training	A. Knowledge of documentation process to track and maintain training records and certifications.	D. Knowledge of assessment methods to identify performance gaps related t training needs.	
	B. Knowledge of analytical methods for determining training needs (i.e., focus groups, structured interviews, surveys).	E. Knowledge of the skill and training requirements of the production team for identifying gaps between current skill levels and what is provided in	
	C. Knowledge of the teaming concepts and cross training methods.	training program.	

**About the Worker** 

Describes what a worker needs to know or be able to do to perform the critical work function

#### OCCUPATIONAL AND TECHNICAL KNOWLEDGE AND SKILLS (continued)

These are the technical knowledge and skills needed to perform the critical work function.

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Skill Category	Specific Knowledge and Skills	Specific Knowledge and Skills
Safety Procedures	A. Knowledge of the hazards in the workplace (i.e., spills, noise, air pollution) to ensure personal and fellow employee health and safety.     B. Knowledge of health and safety standards to ensure quality problems are addressed correctly without impairing health and safety.	C. Knowledge of chemicals and the Material Safety Data Sheets (MSDS) used to perform quality checks to ensure safety gear is accessible and present.
Customer Awareness	A. Knowledge of customer quality expectations and other key concerns.	
	A. Knowledge of basic production processes required to determine the root causes of quality problems.  B. Knowledge of policies and procedures for notifying responsible parties of scheduling changes as a result of quality problems with a given product.  C. Knowledge of benchmarking process and how to use "best practices" in meeting quality standards.  D. Knowledge of production process so that corrective actions can be suggested.	E. Knowledge of where defective products should be stored in order to isolate those from acceptable products.  F. Knowledge of work instructions and work procedures for determining appropriate actions.  G. Knowledge of who is responsible for a process in order to ensure the problem is directed to the right person.  H. Knowledge of quality history of a particular manufacturing process to identify potential corrective actions.

Critical W	ork Function: Corre	ct the product and process to meet quality standards
Knowledge/skill Using Information and Communication Technology	Mean Importance	Examples Use PC to record corrective actions Use PC to trend quality performance
100		Use email to communicate the corrective actions taken to meet specification limits
		Use fax or email to convey information to necessary parties to ensure that appropriate steps are taken
		in the corrective action stages
Gathering and Analyzing Information	4.52	Gather information for process in order to determine capability of process
		Use work center books to get accurate information on status of operation
		Gather information from reject reports to submit for analysis and review
		Analyze the summary and trend information to define the issue or problem
Analyzing and Solving Problems	4.35	Troubleshoot machine processors using collected data in order to establish root cause of process deviation
		Identify storage practices and procedures to minimize surface abrasions on materials
		Develop a machine maintenance schedule in order to minimize down time
		Identify defect patterns detected on floor in order to have them corrected by management
Making Decisions and Judgments	4 22	Decide what corrective actions are required in order to maximize resources
making becisions and addyments	4.22	process
		Determine if decision follows QS-9000 procedures determined in company procedure book
		Determine if new process provides acceptable quality assurance
		Determine if scrap rates are appropriate for the process
Organizing and Planning	3.59	Prioritize the inspection process based on risks and schedule
		Schedule downtime for machine maintenance and plan training for personnel
		Plan corrective actions to be taken when product does not meet customer expectations
		Organize rejection documents in order to conduct trend analysis
Using Social Skills	4.14	Contact manufacturing leader in a cooperative way in order to communicate process capability
		Contact respective parties in a cooperative way to come up with timely corrective actions
		Contact supervisor in a courteous way in order to report corrective actions
		Meet with operators to discuss quality issues in a non-threatening manner to ensure that message is heard
Adaptability	2 55	Demonstrate receptivity to new ideas for CI team to decrease scrap rate
Ασαριανιπιγ	3.33	Revise corrective action plans based on changing production circumstances or constraints
		Demonstrate open-mindedness to production order to close out a corrective action
Working in Teams	4 05	Team with human resources department to identify training needs that eliminate defects
Tronking in round	4.00	Team with SPC coordinator to identify key process characteristics that affect process

	Form cross-functional teams to identify a solution to a quality problem
Landing Others	
Leading Others	3.64 Initiate cooperation among work cell members to communicate production problems with one anothe Influence co-workers to complete all documentation
	Inspire operators to help monitor the operations of new hires and temps
	Coach operators in quality techniques to correct defects
	Coach operators in quality techniques to confect defects
Building Consensus	3.24 Resolve criteria for inspection methods to accomplish a definite understanding of a problem
	Facilitate agreement on audit time in order to minimize production interruptions
	Use consensus to determine if processes are positively impacting organizational goals
	Use collected data to build consensus on what corrective actions are needed
Self and Career Development	3.62 Identify learning opportunities in understanding statistical trends to gain knowledge of process
	Attain training in statistics to improve effectiveness of corrective actions
	Update measurement skills to improve quality
	Attend training in problem solving techniques
Speaking	3.86 Discuss quality problems with management in order to establish procedures
	Provide feedback and suggestions when corrective actions fail
	Discuss training issues with team to ensure related quality items are identified
	Discuss changes in process with team members
	Give verbal directions on how to perform a task correctly
Listening	3.95 Receive feedback from customer regarding field failures in order to promote future business
Listerinig	Listen to concerns of inspectors on potential quality problems in order to ensure appropriate operator
	are contacted
	Listen to the suggestions of production workers on possible corrective actions
	Listen to operators describe a process concern to determine whether the process needs to be altered
	to ensure quality product
Writing	3.60 Write a weekly report to highlight quality problems for the crew
	Write recommendations for corrective actions
	Write quality procedures  Document corrective actions taken
	Document corrective actions taken
Reading	4.55 Read performance outputs in order to understand process evaluation
	Read previous audit results in order to adjust audit schedules
	Review previous documentation on corrective action in order to identify possible solutions

	Review any deviations noted on product documentation to assure accurate work results	
Math	4.10 Calculate sample size for SPC trend of process	
	Calculate the average length of time to assemble a product	
	Use geometry to describe production problems	
	Compare measurements from control chart data	
Science	2.55 Knowledge of physical science to conduct stress force experiments	
	Knowledge of chemical properties to determine if finish paint meets hardness specifications	